JUNE 1955

VOLUME 31 | NUMBER 6

Journal OF THE AMERICAN DIETETIC ASSOCIATION

PUBLISHED BY THE AMERICAN DIETETIC ASSOCIATION

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Changing Food Habits — *C. Frances MacKinnon*

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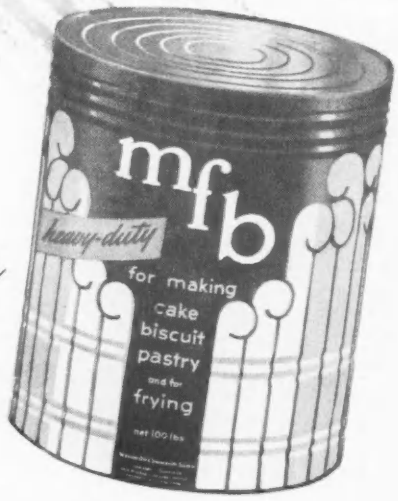

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The Journal of the American Dietetic Association is published monthly by The American Dietetic Association, Mt. Royal & Guilford Aves., Baltimore 2, Md., and 620 N. Michigan Ave., Chicago 11, Ill. Neither the Association nor the Editor assumes responsibility for the opinions expressed by authors of papers abstracted, quoted, or published in full in this Journal.

Subscription Rates: $6 per year in advance in the U. S., Canada, and countries of the Postal Union; all other countries, $7 per year in advance. Special rate to undergraduate students and dietetic interns in approved internships, $2 per year in advance, if order is approved by head of the department. Single copies 75 cents in advance. All correspondence concerning Journal subscriptions, orders for copies or reprints from the Journal, and notices of change of address should be sent to The American Dietetic Association, Mt. Royal & Guilford Aves., Baltimore 2, Md., or preferably 620 N. Michigan Ave., Chicago 11, Ill. Notices regarding change of address should reach the publisher by the *23rd of the month before the date of issue* on which the change is to take effect and both old and new addresses must be given. Claims for Journals lost in the mail will not be entertained more than six months after the date of the issue involved.

Editorial Correspondence: All articles and notices for publication, general correspondence, and inquiries should be sent to the Editor at The American Dietetic Association, 620 N. Michigan Ave., Chicago 11, Ill. Manuscripts are accepted for publication on condition that they are contributed solely to the Journal. Copy must be double-spaced and two copies, an original and one carbon, submitted.

Advertising: All correspondence concerning advertising should be addressed to The American Dietetic Association, 620 N. Michigan Ave., Chicago 11, Ill.

COPYRIGHT, 1955, BY THE AMERICAN DIETETIC ASSOCIATION Printed in U.S.A.

Entered as second-class matter June 30, 1925 at the Post Office at Baltimore, Md. under the act of August 24, 1912.

Published monthly by The American Dietetic Association

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Hunger and Eating

How to Get Cooperation[1]

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DIETITIANS have a most difficult job indeed. To say that the job is a most important one does not in any way deny or minimize the fact that it is also difficult. Doubtless many reasons could be cited as to *why* your job is difficult, but I believe these can be summarized by stating the rather clear and obvious fact of the *complexity* of the undertaking in which you are engaged.

You deal with problems which spread across many scientific fields and you draw steadily on accumulating knowledge in these fields. In addition to making your own scientific contributions, you need to be aware of what is being done elsewhere, constantly synthesizing and resynthesizing information in order to apply it effectively in the interests of health for individuals. You must deal with the *chemistry* of food and the *chemical* processes which take place in the care and treatment of food. You must know the *biologic* needs of organisms. You must have an understanding of the intricate *physiologic* processes of the human organism which convert food to energy, or on occasion tragically fail to do so.

As though this were not enough, you must deal also with *psychologic* phenomena. This brings you into contact with psychologists, and I can only hope that they will match the degree of interest, concern, and responsibility which you yourselves have demonstrated in a continuing joint attack on problems which overlap the two fields.

The variety of problems in psychologic areas with which you must contend is not small, and at one time or another both you and the psychologists with whom you have been working have taken a look at many of them. You have, for example, explored the fact that food as one of the basic biologic necessities of life necessarily has deep-seated psychologic significance to the individual. Food early comes to mean love and affection and security, and the absence of food is early identified as a psychologic, as well as a biologic threat. From here you have gone on to study the social and cultural food habits which individuals acquire, and an understanding of the psychologic meanings and values, symbolisms, and fetishisms, which become identified with these habits.

This area is of particular importance and is the immediate focus of this paper. But before going into the subject directly, let us complete our cataloging of the types of psychologic problems, for I would like to deal with the topic in a somewhat broader context and approach it tangentially.

STAFF INTERACTION

Quite apart from the complex reactions of patients, which must be expected in human beings needing care, there are psychologic problems of a staff nature. Not inconsiderable indeed are the problems which arise from the interpersonal relationships of those who seek jointly but not always effectively to administer care to those who are in need. The efficiency of team action, of staff cooperation, and of the atmosphere, feeling tone, and morale which prevails in a treatment setting—or sometimes is lacking in it—can be the deciding factor in whether there is or is not therapeutic efficiency. In view of the fact that such matters are both intra- and interdisciplinary, all of us share a responsibility for them.

But well beyond the area of interpersonal tensions and friction, and even assuming these to be completely reduced, there is still an important sphere of staff interaction to be considered. This has to do with more positive development in the matter of integration of therapies. Dietitians and psychologists may well have a unique contribution to make here.

INTEGRATED THERAPY

The mission of a hospital is therapeutic. Over the years, as various auxiliary therapies have been developed, they have been added to the hospital, so that it now has—in addition to physicians—

[1] Presented at the 37th Annual Meeting of The American Dietetic Association in Philadelphia, on October 27, 1954.

nurses, social workers, chaplains, occupational therapists, corrective therapists, and persons in many other categories—*also*, dietitians and psychologists. Nutritional education for better acceptance of food is definitely therapy. Has the cumulative effect of these added increments been as great as it might be on the total therapeutic efficiency of the hospital? Belief is growing that it could be greater if there were better integration of effort. Each field, in short, is making its own *special* contribution; but perhaps it could also make more of a *general* contribution. Each helps the patient in a *specific* way; perhaps it could also be more *generally* helpful to other staff.

It is to such problems of integration and complete therapy that we must give thought if the full therapeutic potential of the hospital is to be realized. Consider what is required to make the patient's entire experience in the hospital therapeutic. To begin with, his basic treatment is medical or surgical, and to this all else is contributory. But, at best he sees the physician or surgeon for only short periods of time. The vast bulk of his hours and days in the hospital are spent with others—a fact which in itself accounts for the development of some of the auxiliary therapies. During these long hours and days, such therapy as he receives must come not from the physician or surgeon but from others with whom he is in contact in the hospital setting. Some of these may be administering to him physically, some will be attending to other needs. But all should remember that their contacts with him can be therapeutic for the patient *as a human being*.

In this sense the patient's therapy, time-wise, is largely psychologic in character and all members of the staff participate in it. It is during this time that the patient may develop, or lose, the desire to work cooperatively with his physician in a treatment program. It is during this time that he may develop, or lose, his interest in the immediate world going on around him, focus his attention outward or inward, and react emotionally in ways that are favorable, or otherwise, to his recovery.

INTERACTING DETERMINANTS

When we seek to improve this aspect of the total hospital therapy, it is well to remind ourselves that the patient is at all times a living, breathing human being, always ill and often suffering, and in an environment very different from that to which he is accustomed. His hours are spent responding to those immediately about him, and to his own internal states. These are the two basic determinants of his daily experience, i.e., the people about him and his immediate physiologic state. The two are closely interrelated. If the patient is extremely ill or on the edge of coma, clearly the world about him will be extremely dim and vague. Conversely, when his physiologic state approaches that of normal health, which is the goal of his medical treatment, his response to his immediate world is correspondingly greater. The largest group of patients, of course, are at neither extreme. The problem, then, is to learn better how these two interacting determinants of the patient's behavior can better be understood and utilized to his own advantage during his hospitalization.

With this background I should like to suggest two points of approach which have not, I believe, yet been given the attention they warrant. They are approaches *only* and not specific solutions, but just possibly may be applicable to a range of problems. To give ourselves thinking room, let us ignore practicalities for the moment and see where these notions might lead.

The two approaches which I have in mind do not deal directly with food, nutrition, chemistry, patients, diets, or individual food habits, although they bear upon all of these. They concern themselves instead with the basic concepts of *hunger* and *eating*; hunger as a psychophysiologic state, and eating as a psychosocial process. Around both of these concepts a rather considerable body of knowledge already has been accumulated, for hunger is one of the basic drives and eating is one of the basic human behaviors. How can our knowledge about this basic drive, and this basic process, be put to work more effectively in the interests of therapy?

HUNGER

First, in regard to the psychophysiologic state of the individual, this is something which is constantly changing, not only from day to day but also from hour to hour. This fact we know, although we do not always remember and use it. *One* prominent source of fluctuation is that deriving from the basic hunger drive. This constantly-recurring fluctuation in the hunger-satiety state of the individual has definite psychologic concomitants.

We know, for example, that human beings, in common with other organisms, show increased activity when in a hunger state. We know also that they tend to show increased alertness when hungry. We know that learning, at least of certain types, takes place more rapidly in a state of hunger. We know that the satisfying of hunger by food has a tendency to reinforce that activity which immediately preceded the obtaining of food.

Not so well understood are the types of learning, and also unlearning, which may be impeded by hunger. And more intricate still, but usable, is the knowledge on the learning and modifying of smooth-muscle responses, the visceral and involuntary reactions so heavily involved in emotional response.

QUESTIONS ABOUT TIMING

What is needed—and it should not be difficult to accomplish—is a series of observations and studies

which would allow the direct application of this general knowledge to the specific hospital situation. Then we could answer questions such as the following. Is it better for the surgeon to attempt to prepare a patient psychologically for what is ahead of him when the patient is at the peak of hunger and will soon be fed, or is it better to attempt this communication immediately after hunger is satisfied? Or, is it best to undertake it at the midpoint between the states of hunger and satiety? When the physician needs to question a patient closely for information, will he tend to find the patient more observant and communicative when he is a bit on the hungry side? At what point in the hunger cycle is it best to attempt explanation with a patient? Or reassurance? Or acceptance? What is the optimal time for introducing new ideas, and attempting changes in attitude?

And, when is the best time for the dietitian to broach to the patient the matter of changing his food habits? Let us try to answer this particular question. To begin with, the time *not* to undertake it is during or immediately prior to meals. At this time the patient's behavior is goal-directed toward familiar food objects which have satisfied his hunger drive in the past, and he will resist *any* effort to interfere with or divert this process. Similarly, immediately *after* eating the thought of food of any kind is not interesting and on occasion may even be nauseating. The neutral period in between appears to be the time when the subject of food can be brought up and discussed most dispassionately, objectively, rationally. (There is a hint for housewives with food-rigid husbands here.)

This, at least, is the answer in terms of general principles. But, are there special factors in the unique hospital situation where some degree of physiologic disequilibrium is present in almost all patients? Whether any modification is needed in applying the general rule to the specific setting can be determined just as soon as someone runs a controlled series of observations to test the point, which should not be hard to do.

Before leaving the matter of the hunger drive, it is well to remind ourselves that this is by no means the only element in the constantly fluctuating physiologic state of the individual. The activity-rest cycle, for example, is important. But hunger offers a good starting point for improving our understanding of how the psychologic aspects of a patient's therapy can better be coordinated with his physiologic state.

EATING

So much, now, for the *internal* states of the patient as a governing factor in his experience and behavior. The *other* determinant of his reactions is the immediate hospital world in which he finds himself. This involves the people whom he is physically near but usually has not known before, persons with whom he has only recently become acquainted and toward whom no clear-cut patterns of response have been established. Such persons constitute his immediate world as a hospital patient. How does he relate to them and, for that matter, what reason does he have for doing so, other than the loneliness and need for human contact which is resident in every human being? On what basis can he find common ground with them? What patterns of interpersonal, human, social interaction, which are familiar to him and will bring him satisfaction, can he engage in with this group of relative strangers?

One such basis is *eating*, in the sense of eating together. Here we must consider eating in its fullest and widest significance as a psychosocial process. In every individual's experience, eating is much more than the ingestion of food; from his earliest days it has had its social aspect. It is true that eating represents a satisfaction and a temporary stilling of the hunger drive, but it is also something you do *with others*. It represents an activity which is engaged in with other human beings.

This activity is disrupted by hospitalization, and often necessarily so. Bedridden patients must be fed from a tray. Often modified diets, even though given careful thought, impose some restrictions which add to the feeling of isolation. Aseptic precautions must be observed. Working hours and shifts are factors. But hospital routines are probably not quite as inflexible as they seem if therapeutic values can be achieved by change. And, even within a fixed framework, some nearer approximation to normal experience can be achieved with ingenuity and with a clear appreciation of what one wants to accomplish. For a few moments, then, let us relieve ourselves of whatever reality restrictions might hinder imagination and consider what conditions might be most desirable and beneficial for the patient if they could be achieved. And as a start, let us review what we know about the meaning of eating together.

MEANING OF EATING TOGETHER

Think, for example, of how often in normal living we say spontaneously to another person, "Let's have lunch together," or "Why don't you come out for dinner?" Such proposals are normally made on friendly impulse, and both the invitation and its acceptance convey a feeling of mutual respect, recognition, approbation. Dining together means conversation, and usually this means intellectual or emotional satisfaction. If the atmosphere is cordial, eating and talking together tends to improve the appetite and favor digestion. Individual expressiveness increases and with this goes some degree of emotional loosening-up. The experience is relaxing, and the effect is tonic. The phase is anabolic, both physiologically and psychologically. Patients can

do with this sort of uplift when it can be provided.

This form of interaction between human beings has other values. It is symbolic of equality. In all cultures and societies, the basic rule is that only those of equal rank may eat together. Thus, in societies where the status of women is low, they must eat apart from the men. In authoritarian cultures where children are considered as possessions rather than as persons, they are not permitted to eat with adults. To cite other evidence, we may remind ourselves of the early tradition which required the ship's captain to dine alone. Clearly this was designed to increase social distance and to emphasize and reinforce the authority which it was necessary for him to maintain. In general, wherever and whenever human beings wish to discriminate themselves from other persons or classes of people, a refusal to eat together is the first and most universal sign of separateness.

Acts which imply equality foster a sense of belongingness. We are not alone in the world. The simple act of eating together gives tacit acknowledgment to our common needs, the common fate we share. It is a humbling reminder that human need is basic to all else, and that he who ministers to it is dignifying himself in the doing. Patterns of equality in dealing with our common needs are in our democratic tradition and remind us of the biologic base which undergirds our way of life. The ancient requirements of hospitality among all peoples, the process of breaking bread together, testimony to be found in the great religions of the world and particularly in our Christian tradition—all of these recognize the simple process of eating together as touching the deepest roots and meaning of life itself, and as such it is basically religious in character.

It is not that such meanings are always in the forefront of consciousness. But in the back of our minds we are aware of them, and their overtones and emotional reverberations are great. This is particularly true for patients confronted sharply with the issues of life and death. More than at any other time they feel a need of belongingness, of not being alone.

It is precisely at this time that we force them to eat in solitude, depriving them of one of the simplest and most universal forms of human interaction which could bring them the reassurance they need.

GROUP FEEDING

Surely there are practical problems here, in the matter of patients eating together, and doubtless some are insurmountable. But surely we can do more than we have yet done to put this great conveyor of meaning to better therapeutic use. Even if in many settings we can do no more than introduce fragments and faint echoes of this basic process into the daily lives of patients, we still will have improved their lot. All of this is not to deny the fact that a few patients profit greatly from an opportunity to eat alone, for this offers them individual and sometimes cultural values of greater import.

A careful review of the many different types of wards, services, buildings, and patients in our hospitals might reveal more opportunities. Is there any good reason, for example, why two or three room patients should not have their trays together in one room, if they want to do so? Is the solarium being utilized to best advantage? For those eating in dining rooms, is there flexibility of seating to allow choice of table companions? Are work schedules such that staff can spend time with patients while they are eating?

All of these things and others like them are being done in one setting or another. When it is possible for one of more staff members to eat with a number of patients or at least be with them while they are eating, much can be done toward the directing and guiding of conversation and the development of a friendly atmosphere to enhance the sense of belongingness and group feeling.

The more this can be done, particularly with patients hospitalized for a long period, the nearer you will come to having a major method for handling one of your difficult problems in dietetics. Group influence can do much in motivating individuals to change their behavior, *including their food habits.* The experience of recent years with group therapy has shown clearly that patients can be profoundly influenced by other patients. This applies not only to attitude changes, but also in regard to improved understanding and modification of behavior. It holds true whenever a number of individuals feel themselves a real group, at least in some one respect, for then the opinion and attitudes of others take on value.

Some of the effects come from the fact that patients use different language from that of the therapist and often are able to say things in ways which are more readily understandable to other patients. Another factor is the difference in relationship between therapist and patient and between patient and patient. Hearing things from another patient, even though it is only what the therapist previously has said, carries a certain peculiar validity. This is particularly true of those with patterns of resistance to authority figures.

In the matter of *changing food habits*, we mentioned earlier that the best time for the therapist to broach the subject to a patient is between meal times. But, once this is done, the subject will spontaneously come up, or can be introduced at meal time, whenever there is group eating. Group conversation about food is a normal occurrence and a totally different matter from individual urging The control of group discussion so that it is always therapeutic requires some skill but is certainly not beyond the joint talents of interested staff members.

SUMMARY

Modern hospital treatment includes many forms of therapy in addition to the strictly medical and surgical, which is basic and primary but fills a relatively small proportion of the patient's hours and days. The full therapeutic potential of the hospital will be realized as we learn to integrate to best advantage the auxiliary therapies which fill much of the patient's psychologic time. During this time the patient's experience is largely the product of two determinants, his response to his own internal states and his response to the world of people around him.

The dietitian may be able to make a special contribution for she deals with one of the basic drives, hunger, which results in a constantly fluctuating psychophysiologic state. Much is known about the psychologic effects of the hunger drive, for example, and it is suggested this knowledge be applied to determining the optimal times in the hunger cycle for such therapeutic efforts on the part of staff as involve patient-receptivity, explanation, questioning, acceptance of new ideas, change of attitudes, and so forth. As an illustration, general principles regarding the hunger drive are applied to the problem of changing food habits of patients.

The dietitian also deals with one of the basic human behaviors, eating. The psychosocial process of eating together is reviewed, with some emphasis on the symbolic meanings of this simple and universal form of human interaction. Suggestions are made for its greater utilization in therapy, with illustration in terms of the problem of changing food habits.

Civil Defense

If the dispersal of populations of large cities is necessary to survival after war-caused disaster, the burden of responsibility for the care of these people will fall on small communities. All their facilities, skills, and talents would be required.

Feeding vast numbers of refugees is a problem of vital importance, although it is often forgotten that people must have water and food fairly quickly and regularly. In the midst of confusion, shock, grief, and terrible insecurity, the sight of simple but familiar food, prepared and served with a comforting word by people who know what to do, helps to lift the morale of victims, ease tension, avert panic, and restore a feeling of security. Food is an effective means of mass therapy and should rank with other methods of treatment.

Civil defense is a relatively new dimension of patriotism in the United States. It is still in its infancy and like many infants is subject to growing pains. Under the Civil Defense Act, responsibility for action is placed on states and localities. It is up to them to devise whatever measures are necessary to establish and train an organization capable of providing for every primary necessity of life, including the feeding of survivors.

In March 1953, the National Advisory Committee on Emergency Feeding jointly sponsored, with the Department of Defense and the Federal Civil Defense Administration, a pilot course on survival feeding at Fort Lee Quartermaster School. Following this, thirty similar courses were conducted at Army Food Service Schools throughout the country for selected state representatives. Altogether, some twelve to fifteen hundred persons took this course and are today teaching others and assuming leadership in their local civil defense organizations. One hundred or more members of A.D.A. received this training.

The blue prints for civil defense may undergo many basic changes in the days to come. Already, some delegation of responsibility has been made by President Eisenhower to the Department of Health, Education, and Welfare: financial assistance and clothing to the Federal Security Agency; certain phases of the public health to the U.S. Public Health Service; development of training materials for schools and colleges in civil defense skills and fundamentals of behavior during emergencies to the U.S. Office of Education; aspects of food and drug inspection and control in attacked areas to the Food and Drug Administration. Responsibility for food supply and procurement has been delegated to the Department of Agriculture. These agencies have the task of planning national programs, developing technical guidance for states, directing federal activities, and, in the case of the Public Health Service, providing a reserve of professional personnel from support areas for those damaged in enemy attack.

Regardless of the changing civil defense picture, community feeding plans and the training and orientation of food volunteers should continue. Adequate plans and trained workers can be fitted into any over-all civil defense plans or patterns that are ultimately developed.

Dietitians, nutritionists, food managers, and other food service workers cannot ignore their important role in the development of plans and programs for emergency feeding. It is a problem that requires the knowledge and technical skill of professional and other personnel in the food service business to solve. We are needed now as planners and teachers, and we will be needed as workers in our places of business when disaster occurs.—*Excerpted from a talk by Dorothy L. Bovee, A.D.A. Chairman of Civil Defense, delivered before the Kentucky Dietetic Association in Lexington on March 26, 1955.*

Changing Food Habits—The Dietitian's Dilemma[1]

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TWENTY-FIVE years ago the membership of The American Dietetic Association might have been aware that there were cultural anthropologists, but I doubt if more than a few had heard of clinical psychologists. What is more, neither of these specialists would have been invited to an annual meeting. Today a full dress discussion of the subject of changing food habits could occupy a two-day conference at least. In addition to the anthropologist, the educator, and the clinical psychologist, there would be experimental, social, and child psychologists and maybe a psychometrician to tell us about the probabilities involved in choosing cauliflower instead of caviar. There would be physicians in several specialities of medicine, food economists, food technologists, sociologists, biostatisticians, nurses, teachers, and health educators, to name a few of the specialists who come to mind. The many facets of this absorbing subject and the variety of specialists who can illuminate them brings to mind the "Blind Man and The Elephant."

It was six men of Indostan
To learning much inclined,
Who went to see the elephant
(Tho all of them were blind)
That each by observation
Might satisfy his mind.

The second observation is that the term, "changing food habits," hints at regulation. Of course, most people will agree that in times of national emergency, there may have to be some control of the distribution of food and that certain population categories must have prior claims to those foods of high nutritive value which may be in limited supply. The United States had no experience with this kind of rationing during World War II, but in the United Kingdom supplementary rations were allotted to pregnant and lactating women, infants and children, the aged, and the sick. These allotments represented a certain degree of coercion or regulation because they were not made on the basis of individual preference but rather on the basis of nutritional need as determined by laboratory science.

However, no such emergency exists today. In the United States we have a food surplus which is a source of worry to economists and to politicians alike. Purchasing power remains higher than before World War II and food costs are said to be dropping, although imperceptibly. There is an upward trend in the consumption of foods of high nutritive value. Nutritional surveys yield no evidence of endemic deficiency disease. Under the most favorable conditions of national food supply existing anywhere in the world, why should we concern ourselves about how people choose their food? Let us try to state our position on this question.

BASIC ASSUMPTIONS

The nutritionist and the dietitian, by virtue of the same academic preparation, approach their work with a few basic propositions which might be stated as follows:

A. Adequate nutrition is an indispensable condition of health.
B. The maintenance of or the achievement of a state of adequate nutrition depends primarily on a diet which supplies the essential nutrients. Such a diet presupposes two conditions:
   1. An available supply of foods which contain the nutrients.
   2. The choice and consumption of a diet which furnishes these nutrients in amounts appropriate to the needs of the group or the individual in question.

As a comment on the first condition, those of us in nutrition and dietetics are quite aware of the relationship between the food practices of the nation and the formulation of agricultural policies.

[1] Presented at the 37th Annual Meeting of The American Dietetic Association in Philadelphia, on October 27, 1954.

The complex organization of our society, molded as it is by the application of experimental science, inevitably must result in a planned food economy. The wisest use of land is for the production of food crops of high nutritive value. Production must be accompanied by effective demand if it is to be profitable. Assuming adequate purchasing power, effective demand in turn may require a change in food habits by sizable sections of the population. The creation of a national food pattern through education can serve as one measure for stabilizing a food economy because it assures the balance between supply and demand.

However, it is with the second condition, the choice and consumption of an adequate diet, that we are concerned here. For nutritionists and dietitians, the accepted reason for altering food habits is the maintenance or the acquisition of a state of health insofar as the nutritive process can contribute to this end. Since our goals and the means thereto are clear and seemingly unassailable, it is disturbing to find that the people we serve often do not agree with us. The disagreement concerns not only the means of acquiring health but even the desirability of health itself as an end. This conflict of professional values with popular and personal ones may cause the dietitian or nutritionist to be regarded as rigid and uncompromising by non-professionals and the people to be considered as indifferent by the dietitian. We grant that the road to health is often made a narrow and a rocky one by the literal-minded among us, but there are others among us who see a primrose path of rational hedonism which in our society is still not acceptable because the popular mind cannot always reconcile the unabashed enjoyment of food with a diet that will maintain health.

THREE TYPES OF PROBLEMS

With this general statement of the position of the worker in foods and nutrition, let us take three types of situations in which she may be expected to effect a change in food habits:

(a) A given segment of the population such as a so-called stress group. In this instance a change in feeding practices may add degrees of improvement to the state of health already existing.

(b) A situation involving group care. Here the limitations imposed by institutional living will necessitate conformity to a general diet with minor regard for individual preferences.

(c) A state of disease. For a given patient, an altered physiologic condition may require a change in the usual diet as part of therapy.

A STRESS GROUP

The weanling infant will serve as an example of a stress group. Medical supervision of the well child is an accepted part of public health programs. It may be given by the medical practioner in his private office or by the personnel of a well-child conference. Among other things, the mother is guided in the early introduction of foods other than milk. Semi-solid foods, such as cereals and vegetable purées, are given as early as the second or third month so that the transition from liquid to solid foods is made gradually and systematically. By the time an infant is weaned from the bottle or breast, he is taking a varied diet which provides ample quantities of the nutrients he needs for growth. This practice is current in most segments of our society, and it is made easier by the general availability of commercial infant foods.

However, there are some segments in which either the lack of medical guidance or the presence of traditional weaning practices results in hazards to the infants' health. The growth and development of these infants is below average, and the incidence of food-borne infections is much higher than in the general infant population.

Public health agencies continue to make more medical services available, but it is harder to deal with tradition. In a given sub-culture, the infant and the small child may be regarded as an additional care and their value to the family may not be acknowledged until they are able to assume some duties around the house. Illnesses which are taken seriously when they appear in older members of the family are regarded as inevitable in infants. A baby who has had diarrhea for a week or so may require an extensive period of hospitalization before he is well again. Any attempt to teach his mother to prepare his food so that it will not be a source of infection may meet with resistance because she has been brought up to think that babies should not cause so much fuss.

The gradual introduction of semi-solid foods beginning in early infancy may meet with the same response. In her social group, babies have always been weaned with foods from the family table, using whatever part of the food the baby could take easily either by himself or with a little help. With some dietaries this traditional practice will produce good growth. With others, it marks the period when an otherwise healthy infant may begin to lose ground insofar as his growth is concerned. The result is that he arrives at school age smaller and lighter than his peers from other social groups where weaning practices are more favorable. In some sub-cultures, for instance, the high value accorded to broth or juice or even to bottled beverages as appropriate foods for infants may make it nearly impossible for the older infant to ingest enough calories to maintain the weight increments which characterize good growth.

When the physician or the public health nurse brings these feeding problems to the nutritionist, she usually can find practical solutions which call for a slightly different use of the materials at hand with no additional expense. But to make these changes

acceptable is another matter. The mother may be willing enough herself to follow directions, but she is dissuaded from doing so by the older women in her family or by her neighbors.

The nutritionist must think of change in a frame of reference somewhat different from the one she uses in dealing with people who share her social values. In this instance, she needs to be concerned not only with the strictly dietetic aspects of weaning but with the significance of weaning practices in the value system of another cultural group. If she were working with the Bantu in darkest Africa, she would find more reading material on this subject than she could cope with. If she is working in a small community in the southern Appalachians, more likely she will have to find out for herself and not being a professional student of culture she is likely to get answers that are misleading or incomplete. Meanwhile, her colleagues may decide that she isn't much help to them or worse still, they will fix the people with a label of indifference to the health of their children.

INSTITUTIONAL FOOD SERVICE

Under most conditions of institutional living, menus and types of food preparation are necessarily limited. The funds allotted to the dietary department usually are fixed for a given period and the budget is an important factor in deciding the choice of food and the manner of its preparation and service. The purchase of foods in quantity must be made well in advance of the day on which they will be used. Also, to insure dishes with a uniform quality and yield, recipes must be standardized. The size and competence of the labor force available, the amount and quality of equipment in the kitchen and service units, the layout of the institution itself will be other factors affecting the meals which arrive at the patient's bedside. Needless to say, the complexity of these factors is directly related to the size and nature of the institution. Under such a set of circumstances, the idiosyncratic behavior of individuals in regard to food, sabotages to some extent the machinery for producing meals and conversely, satisfying the desires of a particular patient becomes more difficult.

Contrary to the opinions usually held by patients and staff, dietitians also resent the limitations imposed by these factors. The selective menu and the cafeteria both permit some degree of individual choice and represent an attempt on the part of dietitians to relieve at least partially the stress involved in group feeding. The individual who cannot be satisfied by this degree of choice and the reverberations of his dissatisfaction constitute one of the most difficult problems encountered in group feeding. His demands may be entirely justified and easy enough to meet as a single incident. Suppose, for example, that four patients on four different wards of a tuberculosis sanitarium request custard for supper instead of the dessert on the menu. The request is a reasonable and a modest one. "Of course," says the doctor. "Of course," says the nurse. "Why, of course," says the dietitian. It's easy for the diet kitchen cook to turn out four custards; the patient is pleased and expresses his pleasure. So, the next day the other five patients in each of the four wards decide *they* would like some preferential treatment. "Of course," says the physician—but not the dietitian. She knows that the overworked cook in the diet kitchen could handle four special orders, but she can't handle five times that many. She is a good cook and hard to replace; she needs a helper which the budget won't permit. The dietitian manages to keep her on the payroll only by making few extra demands. So she must tell the patients that they cannot have their special desserts, and everyone concerned decides that dietitians are incorrigible routinists and have no understanding of what it means to be ill.

A DISEASE CONDITION

A middle aged man who has always liked plenty of good food and drink develops diabetes. The symptoms which accompany the onset of the disease cause discomfort and fear; the need for insulin imposes a restriction on the freedom of his daily living, and the setting of limits to one of the tangible good things of life, i.e., the free choice and enjoyment of food, is adding to a burden that at times seems unbearable. With food an important factor in his treatment, the dietitian becomes the person on the medical team who assumes a considerable part of the responsibility for helping him and his family to adjust to a new situation. If the family is a happy one with give-and-take among its members, it is a simple matter for the dietitian to arrange a regimen that will satisfy the patient and will receive the support of other members of his family.

Under other conditions, however, curtailing the free choice of food will impose a serious strain on the relationship between the patient and his family. Cooperation between the patient and his medical advisors is impossible while this strain exists. Not infrequently the physician blames the dietitian when the patient cannot or will not follow dietary instructions. A second strain then develops in the medical team and renders it less effective in offering support to the patient and in guiding his treatment. If both the physician and the dietitian could have some insight into the personality structure of the patient and the probable ways in which he might react to stress *before* antagonistic behavior begins to develop, the patient's treatment would be more effective and both time and wear-and-tear would be saved for an overworked clinic personnel.

Out of a host of possible situations, three have been outlined to serve as illustrations of our need

for help in understanding and in motivating behavior. That we recognize this need is evident in the contents of our JOURNAL. In recent years there is hardly an issue that does not have at least one article dealing with aspects of behavior. More often than not we are exhorted by other professions rather than given specific counsel. It is true that our training puts more emphasis on the physiologic aspects of nutrition and the chemistry of food than on the meaning of food in the emotional lives of individuals and of groups. We acknowledge that we have much to learn from the behavioral sciences. What we need now are more reports of instances where changes in food habits have resulted from effective cooperation between members of our profession and the educators, the students of culture, and the students of behavior.

INFORMATION WE NEED

The instances I have cited pose some questions for which the other professions may have the answers:

What is the meaning of food to a given cultural or subcultural group?

What role do feeding practices play in the formation of the personality characteristic of the group?

How can cultural values be used constructively in bringing about change?

What kinds of educational materials are suitable for different groups, considering their systems of motivation and their ability to learn?

Are there other points of leverage for change, such as comfort or health?

What is the potential of illness for affecting change? How can this potential be directed and sustained?

Whose sanctions are important in motivating and maintaining change, i.e., those of the physician, the dietitian, the social group, the personnel of an institution?

How can idiosyncratic demands be reconciled with the exigencies of institutional or group feeding?

Is it possible to aid the dietitian in recognizing those problem patients whom she can help with a little assistance and those whom she should refer for special care?

Other dietitians could raise a hundred questions that are more meaningful than these. We recognize that our work affects the health and happiness of millions of people in hospitals, in sanitoria, in custodial institutions, in school lunches, in the general population. We ask for guidance in making it more effective.

World Fishery Survey Planned

Greater use of aquatic resources for food could easily be at least doubled without affecting the productive capacity of seas, lakes, and rivers, according to an estimate of the Food and Agriculture Organization of the United Nations. To gain more exact knowledge of the possible food supplies which could be obtained from the world's waters, FAO proposes to conduct a world survey of living aquatic resources.

At present, FAO estimates, the world's water areas (which cover three-fourths of the earth's surface) provide about 1 per cent of man's total food supplies and about 10 per cent of his total animal proteins. A possible doubling of this yield, it is felt, is "very likely a minimum, but any considerable upward revision must probably wait for a more accurate assessment of the world's marine resources." It is for this purpose that the survey is planned—to provide as accurate a picture as possible of the stocks of fish throughout the world, how they are divided between species, where they are, their normal migration patterns, and what is happening to these patterns.

In the April issue of FAO's periodical, *Memo*, latest statistics on world fish production and consumption are given. In 1952–53, annual world fisheries production was about 27 million tons, live weight, including turtles, seaweeds, mollusks and crustaceans, but not including about 2 million tons of whale. About 90 per cent of this production came from salt waters, the remainder from inland waters. Nearly 12 million tons, or over 40 per cent, came from the Far East and about 7.2 million tons from the European region. Other regions produced rather less, North America being the highest with an annual fisheries catch of 3.5 million tons. About 40 per cent of this total catch was consumed fresh, 7 million tons were cured, and further quantities were frozen, canned, and reduced to oils and meals.

In some areas, says *Memo*, "fisheries resources were not being exploited to an extent anywhere near their safe productivity." Other places which are good fishing areas are virtually neglected altogether.

FAO declares, "There are other less commonly exploited food resources which cannot be ignored. Such resources are the zoö-planktons, which are taken in considerable quantities in Asian countries for the manufacture of pastes and other fisheries products. Or seaweeds, which, suitably processed, can yield large quantities of foods rich in carbohydrates. It has been estimated, for instance, that Scotland alone could produce from 70,000 to 110,000 tons of carbohydrate annually for human or stock consumption, from seaweeds harvested along the coastline. In fact, production from the world's water areas is not limited by the number of fish to be caught but merely by man's present ability to find, catch, and distribute."

Nutrition and Alcoholism—A Review[1]

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THE incidence of alcoholism in the United States is high. Exactly how high is difficult to tell. The most frequently quoted figures are those of Jellinek which are based partly on the mortality statistics for liver cirrhosis (1–3). According to his estimate, there are approximately three million alcoholics in this country. These figures show that the incidence of alcoholism among men is approximately six times as great as that among women. The incidence among men has been increasing in the past ten or more years. There has also been an increase in the incidence among women, especially for the latter part of the last decade when the increase was considerably greater than for men. According to Bacon (4), the incidence of excessive drinkers among the male population in the United States is about 6 per cent. A much lower incidence was suggested by Page, Thorpe, and Caldwell (5) after making a special survey in a large industry. They found 0.9 per cent of the employees to be alcoholics. Their report indicates the difficulties in determining the actual number of alcoholics and emphasizes the fact that "the exact scope of problem drinking is not known."

There is also a regional difference. Georgia, South Carolina, North Carolina, Alabama, Mississippi, and Arkansas have very low rates, whereas the incidence in the northern states was much higher (3).

ETIOLOGY OF ALCOHOLISM

A number of years ago Bowman and Jellinek (6) reviewed the theories that had been proposed to explain the development of alcoholism. At that time psychologic and psychiatric disturbances were considered of paramount importance "in driving a man or woman to drink." More recently, hormonal disturbances have been proposed as the underlying derangement. On the basis of this theory, a number of alcoholics have been treated with adrenal cortical hormones and ACTH (7–10). The efficacy of this treatment is still being studied, but evidence is appearing that although the hormone injections produce some subjective improvements, they have no influence on drinking habits (11, 12).

Nutritional deficiencies, whether of a dietary nature or conditioned by an excessive requirement on the part of the individual, have recently been implicated in the etiology of alcoholism. It is the purpose of this review to consider briefly the animal experiments on which the above theory has been based and to discuss the studies made with human beings to determine the part played by nutritional deficiencies in the development of alcoholism.

From an historical standpoint it is noteworthy that a number of attempts have been made to cure alcoholism by dietary means. These early attempts at diet therapy are not well documented, although the reports describe in glowing terms the wonders of the cures. A "vegetarian" regimen appears to have been the basis for most of these "cures" (6 [p. 51]; 13–16). The proponents of these programs were probably motivated by the "auto-intoxication" theories which were receiving considerable attention at that time (17, 18).

VITAMIN DEFICIENCIES AND ALCOHOL CONSUMPTION IN RATS

Mardones and his co-workers at the Institute for Investigation of Alcoholism in Chile observed (19, 20) that rats placed on a diet composed of casein, sucrose, vegetable oil, autoclaved brewer's yeast, and salts consumed considerable amounts of alcohol. It was reported that the diet was deficient in thiamine and Factor N, which was believed to be a new vitamin. The addition of liver, meat, wheat germ, or untreated yeast rapidly reduced the voluntary alcohol consumption of these rats. These substances were considered good sources of Factor N. So far, Factor N has not been completely identified (21).

Westerfeld and his associates at Syracuse have studied the influence of a deficiency of the B-complex on the voluntary intake of ethyl alcohol by

[1] Presented at the 37th Annual Meeting of The American Dietetic Association in Philadelphia, on October 26, 1954.

rats. They found (22) that when rats were placed on a vitamin B-free diet there was a prompt and marked increase in the alcohol consumption. Here, again, the animals were given the choice of either water or 20 per cent alcohol. After the rats showed a plateau in the alcohol consumption, the addition of B vitamins produced only a temporary reduction in their alcohol intake. Furthermore, even if these vitamins were added to the diet from the start of the experiment, the alcohol intake increased after a period of ten to thirty-five days. When 5 per cent of Wilson's Liver Fraction L plus all of the B vitamins were added to the diet from the start of the experiment, there was no increase in alcohol consumption. However, the addition of these substances to the diet of rats consuming large amounts of alcohol produced only a temporary reduction in their thirst as measured by alcohol consumption. When 15 per cent of untreated brewer's yeast (a potent source of Mardones' Factor N) was added to the vitamin B-deficient diet, only a temporary reduction in alcohol consumption occurred.

As had been reported by others, Westerfeld and Lawrow observed (23) a high degree of variability in the voluntary consumption of a 20 per cent alcohol solution by the rats on a thiamine-deficient diet. Of a group of twenty-one rats, thirteen showed no change in alcohol consumption while on the deficient diet. Only four rats increased their alcohol intake—those which lived longest. The sparing effect of alcohol on the thiamine requirement was observed by Lowry and associates (24) for the rat and by Westerfeld and Doisy (25) for the pigeon.

Williams and his associates at the University of Texas have extended the studies on the relation of nutrition to alcoholism in rats. With the interest shown by this group in individual variability (26), it was only natural that this tenet should guide their work in alcoholism. Some of their early work on alcoholism had to do with the effect of vitamin deficiencies on the voluntary alcohol consumption of different strains of rats (27). Not only did they find considerable variation in the alcohol consumption of the different strains, when they were fed deficient diets, but they also noted a great deal of individual variability within each strain. For some strains, all of the recognized vitamins had to be added to reduce the high alcohol consumption associated with the vitamin-deficient diet. In other cases, supplements of such things as linseed oil were required to reduce the alcohol intake.

Additional studies (28) showed that when rats were fed diets deficient in a single vitamin, their alcohol consumption increased to the greatest extent in the presence of deficiencies of thiamine, riboflavin, pantothenic acid, or pyridoxine. This observation fitted in with the theory that alcoholism resulted from a nutritional deficiency since the above vitamins, according to these workers, "are those which function in the early stages of carbohydrate metabolism (riboflavin, thiamine, and pantothenic acid) and in the utilization of amino acids as an energy source (pyridoxine)." It is difficult to see why special emphasis should be placed on those four vitamins in the early stages of carbohydrate metabolism in view of the ubiquitous role of the water-soluble vitamins in metabolic pathways (29–32). The first step in ethyl alcohol oxidation involves a nicotinamide-containing enzyme (33), but so far no reference has been made to its influence on the drinking habits of rats. After the initial reaction in ethyl alcohol oxidation, the resulting two-carbon fragment becomes a part of the metabolic pool in the body and is subjected to similar reactions regardless of their origin. Since that is the case, why should a vitamin deficiency produce an increased "requirement" or "thirst" specifically for alcohol?

VITAMIN DEFICIENCIES AND ALCOHOL CONSUMPTION IN MAN

Early in these studies, Williams (34) proposed a theory which purported to explain the development of alcoholism in man. He recognized that environment plays an important role in the causation of uncontrolled drinking habits, but he was impressed by the fact that not all individuals exposed to the same stressful environment took to drink. Williams felt that the individual's predilection for alcohol was related to individual variability.[2] Although the largest percentage of people in a population respond to a particular drug, external stimulus, or nutritional deficiency in a manner that is considered normal, a certain percentage would not conform to this pattern. On the basis of reasoning such as this, Williams has postulated that "alcoholism is, at least in part, a genetotrophic disease; that is, one which stems from both an inborn or hereditary trait and a nutritional deficiency. The hereditary trait which predisposes toward the disease is the possession of unusually high requirements for certain food elements. These make the individual vulnerable; food as ordinarily chosen is liable not to supply enough, especially when alcohol is consumed; deficiencies result and a craving for

[2] In 1906 Paulson (15) suggested that "there is evidently a physiological reason for the drunkard's thirst, just as surely as there are definite causes for the fever patient's elevation of temperature or for his weariness and fatigue." To emphasize his point, Paulson went on to say that "the eminent British physician, Lauder Brunton, has well said that the frying-pan drums up trade for the man who sells bad whisky; while if the food had been selected with reference to the proper proportions of food elements, sufficiently cooked, and daintily prepared, . . . then each digestive organ would have contributed its requisite quantity of digestive juice. But as it is, large portions of the food are digested by microbes, with the production of corresponding toxins, instead of undergoing normal digestion to nourish the individual, and thereby removing the temptation, as Dr. Brunton expressed it, of trying to lessen the effect of the worry by a glass of spirits at the nearest tap." See also Benedict (36).

alcohol is developed. But if the individual with this hereditary trait is able to get, by any available means, plenty of all the nutritional elements he needs, then the disease does not appear and the hereditary trait which otherwise would be damaging is completely overcome" (35 [p. 31]). According to this postulation, the craving for alcohol is similar to the perverted appetites of animals on deficient diets, the craving for sweets by the diabetic, and possibly the craving for drugs by a confirmed addict.

After the declaration of his hypothesis and the evaluation of his animal studies, Williams treated a number of alcoholics with vitamin pills which contained large amounts of all of the recognized vitamins[3]. The alcoholic was advised to take three capsules daily for the first week. If nothing unusual happened, six capsules were to be taken daily during the next week, and during the third week, nine capsules. The latter level was to be maintained as long as necessary. It is difficult to ascertain exactly how many individuals Williams treated with his vitamin therapy. He states (35 [p. 52]) that the total number of alcoholics who have been treated for "reasonable periods of time (about two months) is something over twenty." Five sketchy case reports were given. In no case was sufficient information available to permit one to evaluate the effect of therapy. There is some doubt as to whether any placebos were used. These studies suffer from the fact that a cure from alcoholism lasting two months, or even six months, is considered by most workers to be entirely too short to permit any conclusion as to the permanence of its effects. Bowman and Jellinek (6) have indicated that at least two years are required before one can definitely say that a person has completely lost his thirst for alcohol. Some drinkers spontaneously remain sober for six months or more without any apparent reason.

Besides the above, four reports have appeared describing the effects of the vitamin pills recommended by Williams on the course of chronic alcoholism. Smith and the group from the Department of Medicine at Baylor University (37) used these pills plus an injection of liver extract once a week on five alcoholic patients who took the pills for a month or more. When the paper was prepared, one patient had been free of alcoholic bouts for ten months and was able to take an occasional beer without any ensuing difficulty. Another patient went on a drinking spree after two months of therapy but then was sober for the next five months. The other three ceased taking pills and resumed drinking.

[3] Each capsule contained: 3.3 mg. thiamine, 2.67 mg. riboflavin, 10 mg. nicotinamide, 10 mg. calcium pantothenate, 3.3 mg. pyridoxine, 0.05 mg. biotin, 1.1 mg. folic acid, 11 mg. para-aminobenzoic acid, 53 mg. inositol, 53 mg. choline, 5 mcg. vitamin B_{12}, 6667 I.U. vitamin A, 33.3 mg. ascorbic acid, 6.67 mg. alpha-tocopherol, and 333 I.U. viosterol.

Trulson and the group at Harvard (38) treated thirty-two alcoholic patients for thirteen months or more. Some received vitamin pills patterned after those recommended by Williams. The vitamin therapy had an equivocal effect in reducing the alcohol consumption. From the description of their findings, it would appear as though their interpretations were subject to a certain amount of bias as evidenced by the statement that ". . . the number of patients taking vitamins was larger than the number taking placebos . . . because many of the patients were in such extreme circumstances that placebo therapy was not justified." If the investigators believed that firmly in the superiority of the vitamin therapy, isn't it possible that some of this enthusiasm may have been communicated to the patients?

One of the latest reports on the use of vitamin pills in treating alcoholism is that of Hoff and Forbes (39). They used the first one hundred admissions for alcoholism to the Medical College of Virginia during the fall of 1952 as their control group. The first one hundred admissions for alcoholism during the following winter served as the vitamin therapy group. In both groups, the patients were maintained at the hospital for one week during which they received liberal amounts of vitamins in addition to a good diet. Thereafter, the control group was continued on an out-patient basis for at least eighteen months. The experimental group was treated likewise, except that vitamin supplements were provided during the out-patient phase of the study. Approximately eighty-five patients in each group completed the study. Hoff and Forbes concluded: "It is our clinical impression that patients in the vitamin group experienced a greater sense of well-being than those in the control group. We could elicit no clinical evidence that the patients of the vitamin or control group acquired any degree of control over their use of alcohol. Our experience demonstrates clinically the value of vitamin supplementation during the initial hospitalization period as well as during a prolonged period thereafter in enhancing the sense of well-being."

A preliminary report has been presented by Feldman (40) on the vitamin supplementation of twenty-six alcoholics. The general tenor is that the vitamin therapy produced no dramatic changes in the drinking habits of the alcoholics even though all the subjects "reported a sense of well-being while on the nutritional regimen."

CRITIQUE OF ANIMAL STUDIES

If one considers the bases on which Williams' theory for the origin of alcoholism rests, there are a number of factors that have not been adequately explored. All of the studies using rats on deficient diets suffer from similar limitations. Lester and Greenberg (41, 42) stressed the point that when rats were put on a deficient diet and offered a choice of water or alcohol as their sole source of fluids, it

was really a limited choice. These workers increased the choice to include a solution of sucrose. When that was done, the rats promptly started to consume large amounts of the sugar solution. At the same time, they reduced their intake of alcohol. The reduction in alcohol intake occurred regardless of the diet. These investigators stated that "it is not suggested that a craving for sucrose has developed" (41). They might have added that they were not advocating the use of sugar as a cure for alcoholism in man[4]. Saccharine solutions had a similar effect.

Another important point about the animal studies is that in spite of a high voluntary alcohol consumption, the rat does not become intoxicated. Lester and Greenberg (42) determined the blood alcohol levels in the rats with the highest alcohol consumption. Even under those conditions, the blood levels remained low. The alcohol consumption by the rat is not compulsive—it is promptly terminated when the animal is given an additional choice, such as sucrose or saccharine solution. For this reason, it is hard to see how the studies with rats have any relation to the compulsive drinking habits of alcoholics whose outstanding symptom is inebriety.

CRITIQUE OF NUTRITIONAL ORIGIN OF ALCOHOLISM

There is no question about the existence of metabolic and nutritional differences in man, but it is still difficult to interpret these differences. For instance, it was observed that the urinary excretion of thiamine is a characteristic of the individual (47). Some subjects in that study showed individual variations in urinary thiamine excretion that were as much as two or three times those of the individual with the lowest excretion. It was impossible to determine the significance of the differences observed in the excretion of thiamine by the above men who had been receiving the same thiamine intake for months. It is still impossible to say that the 24-hr. urinary excretion of a vitamin is an accurate measure of the individual's specific dietary requirement. There is a possibility that these differences in urinary excretion may result from variations in the pathways used to dispose of vitamins that are in excess of the body's actual requirement. Butler and Sarett (48) also emphasized the need for caution in interpreting urinary excretion data. Differences in urinary excretion of thiamine between alcoholics and non-alcoholics have been used by Williams and his group as support for their theory on alcoholism (49).

Popham (50) has questioned the validity of other evidence offered in support of the genetotrophic theory of alcoholism, claiming the incidence of biochemical phenomena reported as characteristic of alcoholics is of dubious statistical significance.

If the alcoholic's predicament were due largely to a metabolic deviation which increased his nutritional needs, then there ought to be some correlation between nutritional deficiencies and the incidence of alcoholism. Epidemiologic evidence shows no such relation. In the first place, the incidence of alcoholism is relatively low among patients with vitamin deficiencies (apart from alcohol-conditioned deficiences). There are many case histories of patients with endemic vitamin deficiencies which make no reference to alcoholism (51–55). In the second place, the incidence of alcoholism is much greater in the northern part of the United States where the nutritional situation is better than in the South (3). If the thirst for alcohol resulted primarily from a nutritional deficiency, one would have expected just the opposite. Suggestive confirmation for the above is found in the reports on liquor consumption in the different states (56, 57 [p. 25]). Finally, the report that alcoholism is at least six times greater among men than women (3, 4) is not in line with the observation that women fail to meet their nutritional requirements more frequently than men (58–60). The lower incidence of alcoholism among women occurs even though their requirement for nutrients is increased during pregnancy and lactation.

A number of studies have been carried out in which alcoholics were given a good diet together with a variety of nutrient supplements. In spite of such therapy, there was no voluntary change in the drinking habits of the subjects. These studies established the fact that alcoholic polyneuritis and alcoholic pellagra were due primarily to the poor dietary habits resulting from the use of large amounts of liquor (61, 62). In one of these studies, Spies and DeWolf (63) kept ten patients with alcoholic pellagra on a well-balanced diet plus 75 gm. yeast per day per patient. Each patient was permitted to drink 600 to 900 cc. whiskey every day. The one way the investigators used to insure complete consumption of the diet was to withhold the whiskey whenever the food was not consumed. The desire for alcohol was not obliterated even after these patients were continued on a highly nutritious diet for several weeks. In another study, Strauss (64) fed ten alcoholic polyneuritic patients a daily diet containing as a minimum 2 eggs, 1 pt. milk, 225 gm. beef or lamb, 240 cc. orange juice, 240 gm. green vegetables, and 90 gm. dried brewer's yeast. Each patient received a weekly injection of liver extract and a vitamin B concentrate. In spite of this high vitamin supplementation continued for as long as 130 days, there was no change in the drinking habits of the patients. Others have observed no reduction in alcohol consumption by patients maintained on good diets for as long as eighteen months (65, 66).

[4] One therapeutic program advocated for alcoholism suggests the use of sweets together with other measures. The statement was made that the "consumption of sweets seems to allay the desire for alcohol" (43). A number of reports have indicated that the administration of glucose with or without insulin to intoxicated individuals may hasten the return of sobriety presumably as a result of an increased rate of alcohol metabolism (44–46).

Recent work indicates that vitamin deficiencies are seen only rarely among alcoholics today whereas they were quite common fifteen years ago. Figueroa and co-workers (67) screened 16,000 alcoholics in Chicago during the late spring and early summer "when florid B-complex deficiency disease is most likely to appear." Over a three-year period they saw only a small number of alcoholics with signs suggestive of a vitamin deficiency. Other investigators have reported a similar reduction in the incidence of vitamin deficiencies among alcoholics (68, 69). This phenomenon was attributed by Gorman (69) and Figueroa *et al.* (67) to the fact that flour is enriched with the vitamins that were most frequently in low supply in the alcoholic's diet. The improvement in the nutritional situation of the alcoholic has occurred during a period when the incidence of alcoholism was increasing.

SUMMARY

This review is not intended to imply that nutrition plays no role in alcoholism. Since most alcoholics have been on a poor diet for a considerable period of time, the plan for their rehabilitation should include the correction of any dietary deficiencies.

The purported relation of alcoholism to an increased nutritional requirement has not been substantiated by animal experiments. In none of the studies where rats have been maintained on deficient diets has there been any evidence of inebriety or very high blood alcohol levels, even when the alcohol consumption was at its peak. The experimental work with animals has been directed toward an elucidation of the causes of alcoholism. However, the above condition in rats is comparable to social drinking by human beings.

The few reports that describe the effect of vitamin supplementation on the drinking habits of persons addicted to alcohol indicate that the vitamins have little, if any, influence thereon. At best, vitamin supplementation may produce an increased sense of well-being in such patients.

From an epidemiologic standpoint, there is considerable evidence which augurs against the theory that a nutrient deficiency results in alcoholism. A vitamin deficiency, such as endemic beriberi, pellagra, or scurvy, is not known to result in alcoholism. There is a much higher incidence of alcoholism among men than women, even though men eat a better diet. The nutritional requirements of women are increased and occasionally associated with a deficiency during pregnancy and lactation without a concomitant predilection for alcohol. Alcoholism has been increasing during a period when nutritional deficiencies both among alcoholics and in the general population have been decreasing.

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Incidence of Prematurity in Relation to Maternal Nutrition[1]

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THE DIETARY HABITS of 404 pregnant women of low income and living in a predominantly rural midwestern state have been published (1). The present report concerns the incidence of prematurity in the infants born to these women, in relation to the maternal diets. Few of the women had had prenatal care or advice. They were admitted to the Obstetric Ward of the University Hospital about two weeks before delivery. The infants were considered prematurely born if the birth weight was less than 2500 gm. All data on physical status of both mothers and infants were taken directly from the obstetric records.

FOOD HABITS

The dietary patterns of the mothers showed a consistently high intake of white bread and potatoes. Milk intake was surprisingly low, especially so for a dairy state, and both the variety and the quantity of fruits and vegetables eaten were limited. In addition to potatoes, only carrots, apples, and tomatoes were eaten with any frequency. The meat intake tended to follow the financial status, though the latter could not be determined accurately.

The chief nutritional maternal deficiency was of calcium, with protein second. Enrichment of bread and flour prevented severely deficient intakes of iron, thiamine, and riboflavin in many women. Potatoes were the chief source of ascorbic acid. Tomatoes and carrots provided ample carotenoids.

Caloric overindulgence was far more common than inadequacy of caloric intake; the latter, when it occurred, was usually because of persistent nausea and vomiting. Few patients were inadequately fed because of insufficient funds, and very few were on reducing regimens. Obesity was common, even in the women under thirty years of age. Frequently, diets which were adequate in a majority of the ten nutrients studied achieved that status only because the quantities of the chosen foods eaten were excessive. Thus many women escaped more serious types of malnutrition by becoming obese. Better choice of foods would have resulted in improved nutrition, and satiety might have been achieved without obesity. How many Americans are obese because their habitual choice of foods is poor, leaving them unsatisfied when adequate calories are ingested is a very real question.

NUTRITIVE INTAKE OF THE WOMEN

The maternal subjects were divided into five groups according to their protein intakes (*Fig.* 1). Group A received 85 gm. or more of protein daily; Group B, 70 to 85 gm.; Group C, 60 to 70 gm.; Group D, 50 to 60 gm.; and Group E, less than 50 gm. As the protein intake decreased, an increasing share of the total came from cereals. Figure 1 demonstrates that, for women with these dietary habits, the daily intake of protein parallels the quality of the diet as a whole. The relative intake levels of each nutrient studied ranged in the same order as that of protein. Mean caloric intake was overly high for most groups; mean intake of vitamin A (or its precursors) was consistently good. Even in Group A, many women got less than 0.8 gm. calcium daily, the present recommended allowance for nonpregnant women. As the nutritive value of the diets grew poorer, the average calcium intake decreased more rapidly than did the nutritive value of the diet as a whole. The diets of Group E were uniformly very poor.

[1] This study was aided by a grant from The Roche Anniversary Foundation. Received for publication February 10, 1955.

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[5] The authors are deeply indebted to Dr. J. H. Randall, Head, Department of Obstetrics of this University, for permission to study these mothers and to use the records of the department.

INFANTS

The incidence of prematurity and the neonatal condition of the infants prematurely born to these 404 women have been compiled. Table 1 lists the mothers of each group who gave birth to infants weighing less than 2500 gm. and gives data pertinent to their nutritional status. Nutrients ingested in amounts less than two-thirds the 1953 Recommended allowances (3) are italicized; intakes of less than half the allowances appear in bold face.

Two mothers eating diets high in protein foods gave birth to premature infants weighing less than 2500 gm. The first subject, Ad., pregnant for the sixth time at the age of twenty-seven, gave birth to twins, weighing 2490 and 2360 gm., respectively. Both babies were in good condition and remained so during their hospital stay. This mother had gained 56 lb. during her pregnancy. Her diet was considered ample in all nutrients but calcium; her caloric intake was excessive, 3810 calories daily. The second subject of Group A had intermittent hemorrhage for two weeks before delivery, and required transfusions. Delivery was spontaneous. This mother also habitually ingested more than adequate amounts of all nutrients studied, except calcium. This infant was her twelfth child.

In Group B, three women whose protein intakes ranged from 72 to 85 gm. daily, gave birth to three premature infants, the smallest of whom weighed 1970 gm. These three infants were all in good condition at birth and during the neonatal period. Two of the mothers were young; the primipara (Sh.) had suffered some difficulty from nausea and vomiting during her entire pregnancy. The other young mother had gained only 8 lb. during the nine months. The third mother of this group delivered her sixteenth child at forty-two years of age. She had aborted the two preceding infants. This mother entered the hospital two months before delivery with cardiac failure complicated by auricular fibrillation. She remained under constant care and was pronounced out of failure only eleven days before delivery, which was spontaneous. Her diet during pregnancy had been ample in calories, with good protein intake. She took no milk or milk products. Her habitual calcium intake (0.27 gm. daily) is about one-third the amount found necessary to maintain calcium equilibrium in young healthy non-pregnant women, whereas this woman had delivered thirteen full-term children, each removing approximately 25 gm. calcium from her body. It will surprise no one if this subject develops severe osteoporosis by menopause.

In Group C, four women, receiving from 65 to 70 gm. protein daily, delivered five infants weighing 2275 to 2485 gm. One infant was severely jaundiced, but left the hospital in good condition. The other four, including the twins, were always in good condition during their hospital stay. No serious complications of pregnancy occurred in this group; one of

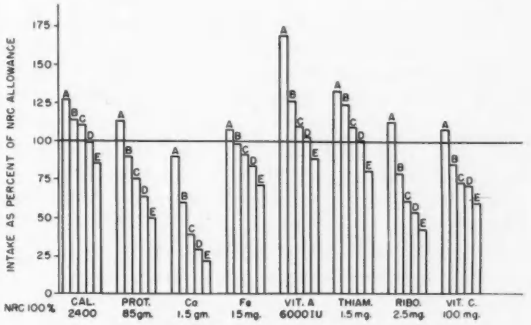

FIG. 1. *Daily intake of nutrients by 404 pregnant women, classified according to daily protein intake. (Reprinted from Jeans, Smith, and Stearns* [1].) *Recommended allowances are those of the 1948 revision* (2).

the mothers (En.) suffered occasionally from dizziness and had three fainting attacks during pregnancy; one (Pe.) had some edema of hands and feet from the sixth month. The mother's diets were all unsatisfactory in calcium content; two diets were relatively low in ascorbic acid and one relatively low in vitamin A. The history of abortions and miscarriages in this group was considerably higher than in Groups A and B, even though the infants delivered during this study were in good condition.

Of 101 mothers whose protein intakes were 50 to 60 gm. daily (Group D), five infants were born prematurely to five mothers. Two of these babies thrived, the largest and the smallest of the four who were weighed. Two of the babies had multiple severe congenital anomalies incompatible with continued life, and a third infant was in such precarious condition it was not weighed at birth and died shortly thereafter. One mother (Jo.) had hyperemesis gravidarum at four months and suffered from paroxysmal tachycardia during pregnancy; a second woman (St.) had 4+ pitting edema of the legs on admission. One mother (Sh.) had a gallbladder attack when seven months pregnant. The daily calcium intake of these five mothers ranged from 0.5 down to 0.1 gm. daily. A quart of milk daily, or its equivalent, would have increased the protein to within safe levels and brought the calcium intake nearly up to the recommended allowance. Their high intake of enriched bread and occasional use of pork liver prevented serious deficiency of thiamine, riboflavin, and iron. Four of the five women ingested ample calories.

Of the seventy-six mothers with the poorest diets (Group E) twelve, or 13.4 per cent, delivered prematurely. All of these infants were single births. Five were first-born. Delivery records of the other mothers showed as many premature deliveries and abortions as term deliveries. One mother had delivered only two full-term infants in nine pregnancies; two of her pregnancies, including the one

TABLE 1

Diets of mothers of premature infants

SUBJECT	AGE	PREVIOUS PREGNANCIES		NUTRIENT INTAKE*†								INFANT	
		Number	Results	Protein	Calcium	Iron	Vitamin A	Thiamine	Riboflavin	Ascorbic acid	Calories	Birth weight	Condition
				Group A (37 Women)—Excellent Dietary Habits									
	yr.			*gm.*	*gm.*	*mg.*	*I.U.*	*mg.*	*mg.*	*mg.*		*gm.*	
Ad.	27	5	5 full-term	105	*0.86**	22.5	12,333	2.44	2.50	138	3,720	2,490 2,360	Good Good
Dm.	37	11	10 full-term 1 premature	90	1.12	16.4	12,035	2.5†	2.45	117	2,965	2,000	Good
				Group B (87 Women)—Good Dietary Habits									
Ha.	19	1	1 full-term	85	**0.45**†	18.0	6,606	2.06	2.01	195	3,180	1,970	Good
Sh.	17	0	—	81	*0.87*	14.5	9,846	1.42	2.07	71	2,795	2,460	Good
Da.	42	15	13 full-term 2 abortions	72	**0.27**	19.0	*3,926*	1.70	*1.26*	80	3,305	2,430	Good
				Group C (103 Women)—Fair Dietary Habits									
Fi.	26	1	1 full-term	67	**0.65**	13.7	4,579	1.71	1.67	79	2,365	2,485	Good
Ho.	28	7	6 full-term 1 abortion	67	**0.50**	15.7	10,109	1.53	1.36	*61*	3,755	2,445 2,410	Good Good
En.	26	6	3 full-term 3 miscarriages	65	**0.67**	14.1	9,392	1.82	1.47	67	2,415	2,455	Severe jaundice
Pe.	28	6	4 full-term 2 abortions	65	*0.86*	12.0	*3,425*	1.41	1.70	**41**	3,015	2,275	Good
				Group D (101 Women)—Poor Dietary Habits									
Jo.	31	2	2 full-term	59	**0.52**	14.0	5,050	1.48	1.38	93	2,365	—	Died; not weighed
St.	**45**	0	—	58	**0.36**	16.8	6,868	2.20	1.84	134	2,805	1,405	Hydrocephalus, imperforate anus, and other anomalies; died third day
Sh.	30	4	3 full-term 1 abortion	57	**0.10**	17.1	6,887	1.66	1.56	89	2,555	2,345	Good
Da.	36	5	5 full-term	54	**0.39**	11.6	7,775	1.66	1.42	**47**	2,715	1,530	Imperforate anus and kidney anomalies; died
Ru.	23	1	1 full-term	*51*	**0.19**	12.5	4,950	1.23	*1.05*	76	1,885	1,150	Good
				Group E (76 Women)—Very Poor Dietary Habits									
Ba.	29	5	3 full-term 2 abortions	*48*	**0.71**	13.8	7,605	1.70	1.35	100	2,765	—	Stillborn; anencephalic with meningocele; not weighed
Re.	19	0	—	*48*	**0.49**	7.5	*3,050*	1.38	*1.16*	70	1,900	1,805	Good
Se.	16	0	—	*46*	**0.24**	10.1	**2,729**	1.00	**0.90**	*53*	2,010	2,395	Imperforate anus
Rs.	16	0	—	*46*	**0.18**	12.1	4,163	1.05	*1.04*	**35**	1,779	2,450	Good
Wh.	19	1	1 full-term	*45*	**0.32**	*9.6*	4,269	*0.93*	**0.73**	*50*	2,110	1,995	Good
Co.	17	0	—	*45*	**0.33**	12.2	**2,845**	1.11	*1.13*	*50*	2,076	1,780	Good
Kr.	23	1	1 full-term	*43*	**0.64**	**7.3**	*3,749*	*0.84*	1.35	**42**	1,810	2,250	Good
Fa.	27	3	2 full-term 1 abortion	**37**	**0.26**	*7.8*	7,034	*0.86*	**0.76**	**48**	*1,365*	2,420	Good
Ad.	28	8	2 full-term 1 premature 5 abortions	**37**	**0.21**	11.5	4,325	1.44	**0.90**	*51*	1,845	2,065	Good
Md.	33	4	3 full-term 1 premature	**33**	**0.17**	*8.6*	5,465	**0.69**	**0.93**	**37**	**1,055**	750	Died third day
Fr.	20	0	—	**31**	**0.17**	**6.2**	**2,405**	1.02	**0.52**	**29**	**1,245**	—	Seven-month fetus; died; not weighed
Ml.	21	0	—	**30**	**0.17**	*7.8*	**1,821**	**0.62**	**0.64**	**33**	*1,650*	1,740	Good

* All values less than two-thirds of the 1953 recommended allowance (3) are *italicized*.

† All values less than one-half the 1953 recommended allowance (3) appear in **bold face.**

reported here, had resulted in premature delivery, and the five pregnancies previous to this had ended in abortion. Three of the women (Ba. Wh., and Md.) suffered from mild to severe nausea and vomiting throughout the entire pregnancy; one woman (Fa.) had idiopathic epilepsy. The diets of these twelve women of Group E were uniformly very poor in calcium, protein, and riboflavin, and were poor in ascorbic acid, vitamin A, thiamine, and iron. The caloric intake of eleven of the twelve was below the recommendations. Yet two-thirds of the babies were listed as in good condition at birth, perhaps because many of them were products of first or second pregnancies. One infant with severe congenital anomalies was stillborn. A second infant, who weighed 2395 gm. and had an imperforate anus, was strong enough to survive operation and lived. The smallest infant of those weighed, 750 gm., was very weak and died on the third day. A fetus, not weighed, age estimated at seven months, also died shortly after birth.

To summarize these groups (Table 2): of the 227 mothers studied in Groups A, B, and C, nine mothers (4 per cent) gave birth to eleven infants weighing less than 2500 gm. Seven of these infants (3.1 per cent) were single births. The birth weights of the infants varied from 1970 to 2490 gm. No stillbirths, no neonatal deaths, and no congenital anomalies occurred among these infants, and all thrived during the neonatal period. The mother of one infant had suffered from serious illness for two months before delivery. Her infant weighed 2430 gm. at birth.

Groups D and E contained 177 women, whose customary intake of essential nutrients was generally poor to very poor. No serious complicating illnesses had occurred in these subjects. Seventeen, or 9.6 per cent, delivered prematurely, all deliveries being single births; this is in contrast to 4 per cent of the 227 women whose diets were considered fair or better and who delivered infants weighing less than 2500 gm. These differences are significant statistically at the 2 per cent level. When the data on single births only are compiled, the differences are even greater, and the findings show differences significant at the 1 per cent level. It appears, therefore, that the incidence of premature birth is higher in the poorly nourished than in the well nourished women. Also, as the diets became progressively poorer, more of the infants were of very low birth weight.

Of the seventeen infants born prematurely to mothers of Groups D and E, seven were in very poor physical condition at birth, while ten of the eleven infants born to mothers in Groups A, B, and C were listed as in good condition at birth and the eleventh suffered only from a transitory jaundice. The sharp differences between the infants of the two groups, D and E, and those of the other three groups, suggests that the diets of the two lowest groups provide less than the minimum of certain nutritional essentials. None of these mothers suffered from obvious deficiency disease; it is possible, even probable, that premature birth of the infant may occur in order to conserve the body of the mother.

OTHER FINDINGS

Not all of the full-term infants delivered by these 404 mothers were normal. Stillborn infants were

TABLE 2

Summary of data on infants born prematurely to 404 women of known dietary habits

GROUP	MOTHERS				INFANTS			
	Number	Delivered prematurely		Average number of pregnancies per woman	Number	Birth weight		Remarks
		Number	Per cent			Mean	Range	
Mothers' Dietary Habits Classified as Fair to Excellent								
						gm.	*gm.*	
A	37	2	5.4	9	3	2283	2000–2490	All infants living and in good condition on leaving hospital
B	87	3	3.4	5	3	2287	1970–2460	Same
C	103	4	3.9	6	5	2414	2275–2485	Same
Total	227	9	4.0	7	11	2344	1970–2490	Same
Mothers' Dietary Habits Classified Poor to Very Poor								
D	101	5	4.9	3.4	5	1595*	1405–2345	2 deaths; 2 multiple anomalies
E	76	12	13.4	3	12	1920†	750–2420	1 stillbirth; 5 neonatal deaths; 4 severe congenital anomalies
Total	177	17	9.6	3	17	1814‡	750–2420	1 stillbirth; 5 neonatal deaths; 4 severe congenital anomalies

* One infant not weighed; 4 weights averaged.

† Two infants not weighed; 10 weights averaged.

‡ Three infants not weighed; 14 weights averaged.

delivered by two mothers whose diets were classed as Group B. Both mothers had diabetes, and the disease had not been controlled until late in pregnancy. A third stillborn infant was delivered by a mother in this group whose pre-pregnancy weight was 264 lb. and who was pre-eclamptic on admission. Another stillborn infant was malformed, hydrocephalic, with spina bifida; no motion had been felt for five weeks prior to delivery. This mother's customary diet was judged fair (Group C).

Intracranial hemorrhage was listed as cause of death of three infants. The diets of their mothers had ranged from fair to excellent.

Severe congenital anomalies were noted in a total of nine infants, full-term and premature; in four infants, the anomalies were incompatible with continued life (Table 1). The diet of one mother was rated fair; the diets of two others were rated poor; and one was considered very poor. One infant, whose mother's diet was rated good, had bilateral club foot, a hydrocele, and undescended testes. A second infant had an imperforate anus, and another showed unilateral cleft palate and lip, with associated nasal deformities. The mothers of both these infants were eating very poor diets. Two infants whose mother's diets were rated good and excellent respectively, had heart murmurs.

Congenital anomalies and many other causes of death in newborn infants depend on many factors, as has often been observed. It is impossible to rate the influence of diet on these conditions in a study such as this.

DISCUSSION

Toverud *et al.* (4) have reviewed recently the effects of prenatal nutrition on birth weight of the infants; many factors are concerned, but the majority of investigators have observed a significant relationship between the nutrition of the mother and the birth weight of the infants. Our data tend to confirm these general findings and to emphasize the fact that, when the quality of the diet decreases below a given minimum, the incidence of prematurity not only rises sharply, but the infants have low vitality.

Darby and his collaborators (5), in their recent study of 2046 pregnant women, report mean daily intake levels of 72 gm. for protein and 1.1 gm. for calcium. Only 28 per cent of our group of 404 women had a protein intake of 70 gm. or more daily, and only 12 per cent ingested 1 gm. or more of calcium daily. The general level of nutrition of the Vanderbilt group was thus considerably higher than that of the Iowa group. The Vanderbilt study reports an increased incidence of mothers "undernourished" as judged by physical examination among the women delivering prematurely; also a larger percentage of these subjects showed intakes of ascorbic acid under 20 gm. daily than was true for the group as a whole.

Burke, Harding, and Stuart (6) observed that the birth size of the infant, both weight and length, tended to parallel the protein intake of the mother during the last six months of pregnancy. In our group, the protein intake was found to be an excellent indicator of the adequacy of the diet in general.

In considering the influence of the mother's nutrition on the incidence of prematurity in our own series, the evidence seems clear cut. Although eleven infants were born prematurely to nine (4 per cent) of 227 women whose diets were rated fair to excellent, four of these infants were twins, with birth weights from 2360 to 2490 gm. One of the other mothers suffered from a serious complicating illness, congestive heart failure. Of the seven single births, the lowest weight was 1970 gm. All infants were in good condition. The incidence of premature birth among the women whose diets were rated fair to excellent tended to rise with the number of pregnancies and their rapidity of succession. The forty-two-year-old mother in her sixteenth pregnancy (Da.) had complicating illness sufficiently severe to account for early delivery. Groups A, B, and C also included one woman of thirty-seven in her twelfth pregnancy, and four women twenty-six to twenty-eight years old, in the sixth to eighth pregnancy. The nutritional demands on these women have been very heavy. Although their intake of many essential nutrients was above the average for the entire group, it may have been insufficient to meet the heavy demands. The calcium intake was grossly inadequate for most of these mothers. With each full term infant removing about 25 gm. calcium from the mother's body, serious depletion of the mother is inevitable with intakes as low as these.

Seventeen mothers (9.6 per cent) of 177 whose diets were rated poor to very poor, delivered prematurely. No multiple births occurred in this group. Three of the seventeen infants were too feeble to be weighed; four weighed less than 1600 gm. and only six weighed 2000 gm. or over. Eleven of these infants were products of first, second, or third pregnancies. Histories of mothers with four or more pregnancies usually showed increasing incidence of abortions and prematurely born infants paralleling the number of pregnancies. The physical status of the infants became progressively poorer as the diets worsened. Three of the premature infants had severe congenital anomalies which were incompatible with continued life, and six of the seventeen infants died before or shortly after birth.

Thus the percentage of mothers of this study who delivered prematurely was more than twice as high in the group with the poorest dietary habits as in those in better nutrition. Even more important is the fact that many of the infants from poorly fed mothers were of low vitality and both the death rate and incidence of multiple congenital anomalies were relatively high.

SUMMARY

The incidence of prematurity rose sharply with decrease in the nutritional status of 404 pregnant women of low income living in a rural state. The most common nutritional deficiencies observed were calcium and protein.

Among the better nourished women, premature delivery tended to be associated with frequency and total number of pregnancies and with multiple birth. Among the least well nourished, the incidence of prematurity showed less relationship to number or frequency of pregnancies.

It was observed that lowest birth weights, low vitality, and larger number of deaths in the newborn period occurred among the infants born to the most poorly nourished mothers.

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Stresses in Consultation

Stresses are inherent in the nature of consultation. One stress is the basic conflict between the consultant and his client regarding who *really* is the most expert in the matter at hand. The consultant has spent years of concentrated study in his specialized field. Yet, the aid which the consultant can render is limited by the very fact of his specialization. His specialized point of view is, by definition, partial and incomplete in contrast to the point of view of the executive (client) who must view problems from the standpoint of the organization as a whole.

The consultant is also limited by the fact that his specialized knowledge more than likely pertains to the *class* of problems rather than to the particular problem which is being experienced by the client. The consultant can cite general principles which hold in a majority of cases, but this is not likely to impress a client who wants to know what to do in his own immediate and unique situation. From the standpoint of the client, the consultant's orientation is "too theoretical" in contrast to his own "practical" orientation. But it is precisely the consultant's ability to abstract similarities from a variety of unique situations and to see underlying principles that makes him useful to the client. This is the basis of his expertness.

In short, two different breeds of men compose the consultant-client relationship—the consultant is a man of knowledge; the client is a man of action. They complement each other, but they cannot supplant one another.

The consultant can lessen the effects of these difficulties in the following ways:

(1) The consultant should recognize that he and his client each have unique contributions they can make to policy formulation, and he should maintain a regard for the limitations of his own contribution.

(2) Before he begins on the consultation proper, the consultant should explore with his client the following aspects of the prospective relationship:
   (a) Those motives of the client in seeking expert counsel which may not be explicitly stated by the client;
   (b) The client's definition of his problem and the differences which may exist between his definition and that of the consultant;
   (c) The expectations of the client with respect to the style of consultation which he considers most appropriate.

(3) The consultant should clarify with the client group precisely where he, as an outsider, stands in relation to the group.

(4) The consultant should not be antagonized or disappointed by any resentment, or lack of cordiality in the relationship. He may find it beneficial to encourage the group to express its feelings openly, since the very "hidden-ness" of hostile feeling may reduce group productivity.—*Excerpted from "Stresses in Consultation" by W. W. Charters, Jr.* Adult Leadership *3: 21 (April), 1955.*

The Vanderbilt Cooperative Study of Maternal and Infant Nutrition

VIII. Some Nutritional Implications[1]

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IN THE mid 1940's reports on the role of maternal nutrition in the prevention of commonly occurring obstetric and pediatric abnormalities fell into two categories. These are illustrated on the one hand by the reports of Ebbs, Tisdall, and Scott (1) and Burke *et al.* (2), indicating that good maternal nutrition prevented a variety of obstetric and fetal complications. On the other hand, Williams and Fralin (3) and Smith (4) were unable to correlate maternal malnutrition and certain obstetric and pediatric difficulties. In 1945, members of six departments in the Vanderbilt University School of Medicine recognized a common interest in this problem and initiated a cooperative study of maternal and infant nutrition. This investigation was designed to: (a) appraise methodology for the evaluation of nutriture during pregnancy; (b) define adequately several "normal" physiologic changes which occur during the reproductive interlude; (c) assess the nutritional level of patients presenting themselves for prenatal care at our hospital clinic; (d) ascertain whether there existed for such patients any significant relationship between nutriture and the development of maternal or fetal complications.

From September 1945 to February 1949, each white patient who presented herself at the Prenatal Clinic of the Vanderbilt University Hospital was entered as a participant in this study. The only basis of selection was that the patient came to this clinic. The socio-economic status of these patients ranged from a low to low-moderate income level. Among these women there was a greater homogeneity in background, environment, and dietary habits than one might anticipate in a larger cosmopolitan area, where racial, religious, and national traits may be pronounced.

Once during each trimester, a nutritional evaluation of each patient was made. This included a physical examination for clinically detectable deficiencies, biochemical determinations on body fluids, and dietary records for seven-day periods. The physical and biochemical appraisals were repeated at the six-week postpartum examination. No attempt was made to alter the routine obstetrical care of the patient, and the nutritional information was not used to influence dietary practice. Therefore, the data represent a description of the clinical, dietary, and biochemical attributes of a total clinic population. They were so collected as to permit an unbiased, independent examination of correlations or interrelationships between nutritional measurements and clinical course.

The details of the sample, the methodology, and some of the nutritional and obstetric evaluation of this group have been reported (5–10). Suffice it to re-emphasize that, except for a lower incidence of abortion, the obstetric and neonatal results in our series of 2046 white women parallel closely widely accepted textbook estimates or United States statistics. This supports the validity of the generalization of our results.

[1] Financial assistance which has made possible this program has been generously provided by grants from the following organizations: The Nutrition Foundation, Inc.; International Health Division, The Rockefeller Foundation; the U. S. Public Health Service (RG-278 through RG-A-4 C6); Tennessee Department of Public Health; and Distillation Products, Inc. Presented at the 37th Annual Meeting of The American Dietetic Association in Philadelphia on October 27, 1954.

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CALORIC INTAKE

The average for some of the nutrient intakes of our patients was below levels widely held as standards of good nutrition. For example, the mean caloric intake for the first trimester was recorded as 2140; for the second trimester, 2200; and for the third trimester, 2020 (6). The mean caloric consumption not only failed to increase between the second and third trimester, but decreased by roughly 200 calories. A similar decrease occurred in the consumption of most of the individual nutrients. So their proportions, one to the other, showed no average change. It seems that the women merely eat less in the latter months of pregnancy. Why did this occur? Is it a reflection of maternal design, or is it a result of the physician's advice? Although our records clearly show an effect of the latter on the diet of the pre-eclamptic patient, no such relationship existed in the whole of the study group. However, reflecting on the mother's position as gestation progresses, it seems apparent that in this area of the world there occurs reduced activity on the mother's part. So, can we not postulate that this decline in caloric intake in the third trimester is an adjustment of intake to needs? This adjustment is no doubt aided by the obstetrician's effort to restrict the weight gain to between ¾ to 1 lb. per week.

These estimates for caloric intake during pregnancy are at the levels indicated by data from pregnant women in the general population of North Carolina and Tennessee (5). We believe them to indicate the magnitude of caloric needs for our cultural and economic position, and we question the validity for our region of those standards in which a 400-calorie increment is added for the hypothetical enhanced need of late pregnancy. Furthermore, it is apparent that the maximum caloric intake is not during the third trimester as is commonly supposed. During lactation, on the other hand, less extensive evidence indicates clearly an enhanced caloric expenditure or loss.

Several reports (11–13) have indicated an average caloric consumption by non-pregnant, non-lactating women definitely below widely accepted standards. The average values for intake by pregnant women in our study are some 200 to 300 calories higher than the average for non-pregnant women in most of these studies. Is it not evident that, whether pregnant or not, women in our modern, mechanized, electrified, automatically heated life, eat fewer calories than has been traditionally accepted?

VARIETY OF DIETS

Seasonal trends in nutrient intakes revealed slight changes relatable to the seasonal food trends, but these were unimportant physiologically.

It is noteworthy that the pattern of food consumed showed frequent consumption of milk and eggs, of green and other vegetables, tomatoes, citrus and other fruits. Contrary to widespread impression of the dietary habits of our southern region, cornbread was eaten less than other forms of bread. For the individual foods which were encountered, from 1 to 85 per cent of the patients recorded no serving during the weeks in which their records were kept. After grouping the foods into the categories of the Basic 7, the percentage failing to consume any food within a category were as follows:

Green leafy, green or yellow vegetables	3.7 %
Tomatoes or citrus fruit	6.7 %
Potatoes or other vegetables	0.4 %
Milk, cheese or ice cream	0.7 %
Meat, poultry, fish, or legume	0.1 %
Bread, flour, or cereal	0.1 %
Butter or margarine	12.5 %

These percentages are for the third trimester; similar figures held for the other trimesters. In other words, the diets of the women were gratifyingly varied, and no disturbing widespread food prejudice was associated with pregnancy. In addition, there was no pronounced change in the foods consumed by individual patients from one trimester to another.

SUPPLEMENTATION

What about pharmaceutical supplementation? How widespread was it? Supplementation is not routinely prescribed in our prenatal clinic, and there was no attempt to alter this practice during the period of this study. Seventy-three per cent of our patients received no dietary supplementation. The remaining 27 per cent were given prescriptions for one or more of the following: calcium, 14 per cent; iron, 10 per cent; B-complex, 5 per cent; and, other supplements, 4 per cent.

We realize that it is a common practice routinely to prescribe supplements for the private and clinic obstetric patients in this country. Is there any evidence in our study to support this prophylactic therapy? We have been unable to find any significant difference in the incidence of maternal or fetal complications, or in the clinical nutritional assessment of the supplemented or unsupplemented group, except among women with iron deficiency anemia. Supplementation with iron in these instances is of indisputable value. Again, perhaps bearing on the appraisal of our findings, is the fact that despite no supplementation in 73 per cent of our subjects, the obstetric and pediatric performance of the group is consistent with widespread experience.

The patterns of blood constituents revealed many changes which may be explained primarily by the hemodilution which occurs as pregnancy advances (6, 14). The decrease in mean hematologic values, serum protein, vitamin A, and ascorbic acid fall into this class. On the other hand, variations such as the increase in mean levels of serum carotene and

tocopherol and in the urinary excretion of N′ methylnicotinamide must reflect normal physiologic occurrences of metabolic origin, the limits of which needed to be defined before attempting to relate deviations from the pattern to obstetric and fetal complications. In other words, a biochemically measurable change in the concentration of a nutrient in the blood or urine during pregnancy may be in either direction, and it may not *per se* reflect dietary intake.

DEFICIENCIES

Frank deficiency disease was absent from the study group. No cases of scurvy, beriberi, pellagra, or other deficiency syndromes were found. The most commonly diagnosed condition of nutritional significance was obesity, occurring in over 15 per cent of all examinations. In the recording of so-called subclinical signs of dietary deficiency, inconsistencies between examiners emphasize the ill-defined, nebulous nature of many of the proposed stigmata. However, the recording of these subclinical signs could be related to four factors—age and parity, season, trimester, and—of major importance—examiner. A great many of the apparent seasonal variations and trimester trends were artifacts produced entirely by examiner differences.

The only physical finding which could be correlated with nutrient and laboratory level was gingivitis. The incidence of gingivitis was approximately 30 per cent when either the recorded ascorbic acid intake was below 20 mg. per day, or the level in the serum was below 0.2 mg. per 100 ml. However, the recorded incidence of gingivitis was almost 20 per cent, even with very adequate intake or serum levels of ascorbic acid. The weakness of this difference indicates that lack of ascorbic acid was not the primary determining factor in the development of the gingivitis, but is consistent with the position that it contributed to its development (15).

The 2046 women in our study, then, had minimal overt evidence of malnutrition, despite average dietary intakes below widely used standards and a high incidence of non-supplementation. Their obstetric performance was that experienced widely in the United States today. These are the group characteristics—remember that some women *did* have obstetric difficulties, some women ate poorly, some ate excessively, and so on. Therefore, we may ask the important question whether those obstetrical complications which did occur could be correlated with prior evidence of poor nutrition. In other words, is there evidence that improved nutrition could be expected to prevent the occurrence of these residual complications?

RELATION OF NUTRITION AND ABNORMAL CONDITIONS

In an effort to decide this, twenty-five abnormal conditions associated with maternal and fetal aspects of gestation were examined (8). Nutritional comparisons were based on dietary intake, biochemical determinations, and physical signs which were obtained *prior to* the recognition or development of the abnormality. It must be recognized that some obstetric situations give rise to abnormal pediatric sequelae and, conversely, that a fetal aberration may be responsible for an obstetric difficulty. In these situations, it is apparent that a causative effect cannot be assigned to nutrition.

Of the twenty-five complications,[3] several revealed differences from the total group which were statistically significant. These deviations in level of nutriture were in both directions—above and below our norm. However, the actual arithmetic differences were small except for the elevated serum carotene and tocopherol levels in diabetic patients, and the lowered hematologic determinations in anemia. The distribution of the remaining individual values overlapped, but as a result of the large numbers involved and the level of significance used (5 per cent), differences in the means were noted.

The intake of one or more nutrients was lowered significantly in women with associated medical disorders, anemia, pre-eclampsia and eclampsia, and in mothers who delivered premature offspring. Hematologic and serum values during one or more periods of gestation were decreased among women with anemia, twins, puerperal complications, and excessive degrees of blood loss. The rating of obesity was increased in the pre-eclamptics and mothers of stillborn infants; edema in women with associated medical diseases, acute toxemia, and twins; and undernutrition in mothers who delivered premature infants. Only in the thirty-seven women with iron

[3] Complications were (starred conditions indicate statistically significant difference from total group):

*Pregnancy disease in general
Chronic lung disease
Diffuse nontoxic goiter
*Diabetes mellitus
*Heart disease
*Anemia (<10 gm. Hb) on any occasion
*Anemia (<10 gm. Hb) postpartum
Hyperemesis
*Pre-eclampsia or eclampsia
*Placenta previa
*Premature separation of placenta
Weeks gestation at delivery <38 weeks
Duration of labor ≥ 20 hr.
Delivery complications
Cesarean section
Labor complications
*Postpartum hemorrhage
Abortions in hospital
*Prematures (<2500 gm. birth weight)
*Twins
Congenital malformations
*Stillbirths and neonatal deaths
*Puerperal complications
*Puerperal morbidity
*Mothers who did not nurse

TABLE 1

Approximated nutrient intakes—means or medians and ranges†—any trimester‡*

NUTRIENT	−2 STANDARD DEVIATIONS	−1 STANDARD DEVIATION	MEAN	+1 STANDARD DEVIATION	+2 STANDARD DEVIATIONS
Total calories	1,000	1,500	2,100	2,750	3,250
Protein (gm.)	40	50	72	90	110
Calcium (gm.)	0.25	0.75	1.10	1.50	2.00
Iron (mg.)	6	10	13.5	18	22
Thiamine (mg.)	0.7	1.0	1.4	1.9	2.2
Riboflavin (mg.)	0.5	1.5	2.5	3.5	4.5
Niacin (mg.)	4.0	8.0	12.0	16.0	20.0
	2½%	16%	Median	84%	97½%
Vitamin A (I.U.)	1,000	3,000	6,000	11,000	19,000
Ascorbic acid (mg.)	20	40	60	100	160

* Values are rounded to fit interval groupings of coded material.

† Ranges are 1 and 2 standard deviations about means, or median equivalent.

‡ Reprinted with permission from the *American Journal of Obstetrics and Gynecology* (8).

deficiency anemia was there clearly defined evidence of nutritional deficiency.

The comparison of the women who fell into the low or high extremes of nutrient intake is especially interesting. Group levels of nutrient intake were delineated on a statistical basis, at one or two standard deviations above and below the means, or, for skewed values, at the 16 or 2½ percentiles of distributions. The actual limits have been rounded off to fit intervals of our coded material (Table 1). It should be noted that at the level of one standard deviation below the means, the intake of vitamin A, thiamine, riboflavin, niacin, and ascorbic acid would meet 100 per cent of the British and Canadian recommendations for the latter half of pregnancy. We must keep in mind the arbitrary nature of dietary standards proposed and acknowledge that they are well above minimal maintenance requirements.

The performance of the individuals falling into these dietary intake groups was examined. The patients with dietary intakes greater than one or two standard deviations above the mean or median levels did not vary significantly from the total in obstetric or fetal performance. The incidence of complications was not significantly lowered or elevated in this maximally nourished group.

Those who were two or one standard deviation below the mean or median, having nutrient intakes less than 1000 and 1500 calories, respectively, would be considered to have an inferior dietary rating. During the third trimester, forty-seven individuals recorded a daily intake of less than 1000 calories. Again, this group did not differ from the total on the basis of obstetric or fetal performance. Even though the number is small, it is noteworthy that we have found no significantly increased incidence of maternal or fetal complications.

CALORIC INTAKE AS INDEX OF DIETARY QUALITY

Inasmuch as caloric intake usually reflected the intake of other nutrients, we shall discuss the implications of several caloric intake levels. The women whose intake was less than 1500 calories were subdivided into four groups:

Group 1: women who had recorded caloric intakes below 1500 at any time during the prenatal period—391 (19.1 per cent).

Group 2: women with an intake below 1500 calories in the third trimester—326.

Group 3: women who had an intake below 1500 calories in the third trimester and also in either the first or second trimester—92.

Group 4: women who represented the differences between groups two and three—234.

The largest of these was Group 1 with an intake of 1500 calories or less at any time during pregnancy. In this group there was an increased incidence of associated medical diseases and a significant elevation in the incidence of pre-eclampsia and eclampsia (Table 2). In the former, it would seem reasonable that this lowered intake was consistent with a state of chronic illness. In the latter case, however, a

TABLE 2

Percentage incidence of some obstetric and fetal complications according to nutrient intake

COMPLICATION	INCIDENCE OF COMPLICATIONS				
	Entire group (2046 subjects)	Group 1 (391 subjects)	Group 2 (326 subjects)	Group 3 (92 subjects)	Group 4 (234 subjects)
	%	%	%	%	%
Associated medical complications	10.4	13.6*	12.3	13.0	12.0
Pre-eclampsia and eclampsia	5.0	7.7*	6.7	4.3	7.7
Puerperal fever	5.6	5.9	4.3	5.4	5.1
Stillbirth and neonatal deaths	3.5	3.6	2.8	2.2	3.0
Prematurity	5.6	4.6	3.4	4.3	3.4
Congenital malformations	2.6	2.0	2.5	5.4*	1.3

* Statistically significant deviation from total group.

TABLE 3

*Comparison of third trimester caloric intakes with third trimester laboratory levels (laboratory levels for given caloric groupings)**

LABORATORY TEST	TOTAL DAILY CALORIC INTAKE IN THIRD TRIMESTER					TOTAL (1665 subjects)
	<1500 (330 subjects)	1500— (555 subjects)	2000— (443 subjects)	2500— (221 subjects)	≥3000 (116 subjects)	
Means						
Hemoglobin (gm./100 ml.)	11.66	11.72	11.57	11.62	11.65	11.65
RBC (million/mm.^{3})	3.95	3.98	3.95	3.94	3.98	3.96
PCV (%)	35.2	35.3	35.2	34.9	35.6	35.2
MCV (microns^3)	89.9	89.6	89.8	89.2	90.2	89.7
MCH (micromicrograms)	29.7	29.6	29.6	29.6	29.7	29.6
MCHC (%)	33.1	33.0	32.9	33.1	33.0	33.0
TSP (gm./100 ml.)	6.31	6.34	6.30	6.36	6.36	6.33
Serum albumin (gm./100 ml.)	3.98	4.05	4.04	4.04	4.09	4.03
Serum vitamin A (I.U./100 ml.)	101.0	102.0	100.0	98.0	102.0	100.8
Serum carotene (mcg./100 ml.)	159.0	159.0	169.0	156.0	162.0	161.2
Medians						
Serum ascorbic acid (mg./100 ml.)	0.351	0.344	0.368	0.371	0.360	0.356
Thiamine excretion (mg./2 hr.)	0.087	0.089	0.094	0.098	0.091	0.091
Riboflavin excretion (mg./2 hr.)	0.703	0.733	0.781	0.699	0.760	0.740
N'methylnicotinamide excretion (mg./2 hr.)	10.0	9.5	9.9	9.4	10.4	9.7

* Laboratory values missing in approximately 2% of cases.

study of the clinical records reveals that in eighty-six of the ninety-three pre-eclamptics, the reduction in total caloric intake was the result of advice given to the patient by the obstetrician after detecting prodromata of the toxemia.

In the smaller group, Group 3, with two records of a dietary intake of less than 1500 calories, there was a significant increase in the incidence of congenital malformation. It is during the first trimester of gestation when congenital defects develop. However, a study of the findings by trimester shows that of the forty-one mothers with an intake below 1500 calories during the first trimester, none gave birth to an infant with a congenital malformation. Hence, it is improbable that a causative relationship exists here.

In the other two categories, Groups 2 and 4, no significant obstetrical abnormalities could be found.

PROTEIN INTAKE

A similar analysis on the basis of protein intake shows that two standard deviations below the mean limited the intake to less than 40 gm. per day, and one standard deviation to less than 50 gm. There were 94 women in the more severely limited group, and 254 in the latter. There was no evidence of increased obstetric or fetal complication in those women with intakes of less than 40 gm. per day.

The Cesarean section rate was higher when the protein intake was less than 50 gm. daily than in the total group, but was not higher if the intake was less than 40 gm. It is obvious that this is not a meaningful relationship. Similarly, congenital malformations were found more frequently with protein intakes of less than 50 gm., but, as before, it was not significant if the intake was less than 40 gm. However, in the group of twenty-eight mothers with an intake of protein below 50 gm. in the first trimester, there was not a single case of a congenitally malformed infant. In neither of these low-protein groups did there occur an increased incidence of toxemia.

Similar to the findings of the Detroit group (16), the protein intake of our mothers was not correlated with either the birth weight or birth length of the infant. No relationship existed between maternal and infant hematologic and serum protein values.

From the total group of 2046 women, only 54 had nutrient intakes two standard deviations or less in all ingredients on at least one occasion during pregnancy, and only nine on two or more occasions. In neither of these small groups was there any significant performance difference when compared with the total study group.

Between various levels of nutrient intake we have paired mean and median levels of laboratory determinations of all the basic groups outlined above (Table 3). Regardless of level of caloric intake, there was no significant variation in the laboratory data.

Clinically detectable evidence of possible nutritional origin has been compared for each trimester by levels of caloric intake. The one clear-cut relationship found was a consistent negative correlation between the quantity of intake and the findings of obesity. This was the expected result in view of the obstetric advice to modify dietary intake regularly given to such women.

COMMENTS

We have outlined the nutritional, obstetric, pediatric, and physical characteristics of a group of 2046 white women who received their prenatal care at the Vanderbilt University Hospital between September 1945 and December 1950. The group population studied is not the lowest socio-economic or nutritional stratum of society, but we feel that the composition of our group approximates closely the usual obstetric group encountered in practice or in the hospital clinic at this time. Accordingly, we believe that the observations are widely applicable to obstetric patients in the United States at this time.

The total group of 2046 white women were evaluated from the time of entry into the study and assessed *prior to* the development or recognition of various obstetric or fetal complications.

The average nutrient intake of the women differed from the Recommended Dietary Allowances as set forth by the National Research Council, particularly in caloric level. During the third trimester, the total caloric intake decreased and there was an associated proportionate reduction in the consumption of most other nutrients.

In those maternal and fetal complications where significant nutritional deviations from the total study group were found, some were a result of rational physiologic phenomena which were readily apparent. In others, the deviations may be meaningless, for when a large number of tests of statistical significance are done, it is to be expected that a certain proportion, dependent on the level used, will be judged as "significant" where there are no real differences. In a few, true differences of unknown etiology were present. Even in these, a primary causative role could not be assigned to nutrition.

Positive correlations were found between obstetric and fetal complications and dietary intakes during the third trimester of less than 1500 calories and less than 50 gm. protein. However, the increased incidence of pregnancy disease and pre-eclampsia and eclampsia appear in both instances *to be responsible for* the lowered intake and not vice versa.

In our patients we are unable to indict nutrition as a major causative factor in the development of commonly encountered obstetric and fetal abnormalities. This means either that there does not exist a direct causative relationship between malnutrition and these abnormalities or that our patients were above any such level of nutrition required to precipitate the disease. We are confident that the conditions which occurred among our patients could not have been due primarily to malnutrition.

We recognize that with a sufficiently low level of nutriture, *nutritional* complications may arise from dietary inadequacies. We do not wish to be interpreted as concluding that nutrition is unimportant in pregnancy. There is no question that pregnancy can be influenced by nutritional deficiencies and that health of the offspring can suffer from maternal malnutrition. In these proved instances, however, the damage was clearly related to nutritional disorders of demonstrable etiology. The conditions do not simulate those diseases of pregnancy which are of undetermined etiology.

We hope that we have developed a base line which indicates the wide range that must be considered normal before attempting to measure obstetric and fetal performance. Can we not liken the differences between our findings and those of some others to one's perspective? It is commonly stated that of one hundred congenitally malformed infants, 40 per cent of the mothers will give a history of acute viral infection during the first trimester. However, when 100 cases of viral infection during the first trimester are followed, the resultant congenital defects occur in only about 10 per cent. We feel that the Vanderbilt Cooperative Study has developed this latter perspective.

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BIOGRAPHICAL NOTES ON THE HISTORY OF NUTRITION

Edward B. Vedder—June 28, 1878–January 30, 1952

Many are the investigators who have contributed to the study of beriberi and the identification and isolation of vitamin B_1, thiamine. There is a wealth of literature on the subject, and much of the early writing was confusing, so much so that according to Vedder, it was difficult "to sift the wheat from the chaff or the rice from the polishings."

One of the clearest and most comprehensive expositions on the subject is that written by Edward B. Vedder in 1913 titled *Beriberi*. This 427-page volume won for its author the Cartwright Prize of the College of Physicians and Surgeons of the Medical Department of Columbia University. As Vedder pointed out, beriberi had first been described in 2697 B.C., was recognized by the Romans in 24 B.C., and is described in the early Chinese and Japanese writings. It was not until the work of Eijkman (1890) and Grijns (1900), however, that polished rice was shown to be a factor in the cause of the disease. However, the work of these investigators was largely ignored, and there was reluctance to accept the clear-cut, carefully controlled experiments of Fraser and Stanton (1907–08) on Javanese laborers which showed that diet of white rice gave rise to the disease but did not occur when cured (or whole grain) rice was used. Vedder in his comprehensive and carefully documented book summarized all the available data and showed how beriberi could be prevented.

Vedder also actively investigated the properties and nature of ascorbic acid, and in 1932 published in the *Military Surgeon* (17: 505, 1932) the results of ten years' research on the extraction of ascorbic acid from lemon juice. Independently, Vedder prepared pure cyrstalline ascorbic acid and confirmed the work of Szent-Gyorgi and of King, whose publications on pure ascorbic acid just preceded his. This paper of Vedder's "A Study of the Antiscorbutic Vitamin," was given the Wellcome Prize Essay Award for 1932.

Edward Bright Vedder was born in New York, June 28, 1878. He received his Bachelor's Degree from the University of Rochester (1898) and his medical training at the University of Pennsylvania Medical School (M.D., 1902). He was commissioned in the Army Medical Corps in 1903. From 1904 to 1910 he served at various stations in the Philippines and U.S. and from 1910 to 1913 was a member of the U.S. Army Board for Study of Tropical Diseases. It was at this time that he carried on his own investigations on rice and beriberi and prepared his prize-winning monograph. Colonel Vedder was Chief, Medical Research Division, Edgewood Arsenal (1922–25), senior member of the U.S. Army Board of Research (1925–28), and Director, Army Medical School at Edgewood (1930–32). He retired from the Army in 1933. For the next ten years he was Professor of Pathology and Experimental Medicine at George Washington University. Then he was director of medical education at the Highland-Alemeda County Hospital, Oakland, California.

Among other researches, he made contributions to knowledge of amebic dysentery, sprue, leprosy, and syphilis, and was author of *Medicine: Its Contribution to Civilization* (1929); *Medical Aspects of Chemical Warfare* (1925); *Syphilis and Public Health* (1918); and *Sanitation for Public Health Officers* (1917).

Vedder married Lily Norton in 1903, and there were two children—a daughter and a son, who is now a lieutenant colonel in the Army Medical Corps.

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B-Vitamin Retention in Frozen Meat[1]

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WITH the use of frozen meat increasing by leaps and bounds, both in the home and in institutions, the need for knowledge of the effects of freezing on nutrients becomes more urgent. Lack of such knowledge has led to cooking recommendations which are at present contradictory. An examination by the American Meat Institute of eleven state agricultural extension publications showed that for home cooking, five recommended thawing frozen meat before cooking, while six suggested defrosting during cooking. Procedures recommended for cooking frozen meat in large quantities also vary. For the most part, studies cover cooking losses or shrinkage, time, cost of fuel, juiciness and appearance, or convenience. Little research has been done on the nutritive changes.

To learn something about desirable procedures for preserving nutrients, this study was developed to investigate the content of thiamine, riboflavin, and niacin in meat at five stages: fresh or raw, immediately after freezing, after two months' storage, after thawing, and after cooking. For intensive study, calves' liver was chosen since, with its plentiful supply of these vitamins, it would be more apt to show the effects of such treatments than a muscle meat. The retention of these vitamins in muscle meats was also studied to a lesser degree.

Procedure

LIVER

Two experiments, the second designed to correct the variation inherent in the design of the first, were conducted with calves' livers.

Experiment 1. Eight fresh calves' livers were used, two being purchased from wholesalers at four weekly intervals. The livers were divided for the various treatments in such a manner that all areas of the liver received the same treatment an equal number of times. In all cases, two replications with three duplicate analyses were possible, and for four treatments, four replications with three analyses each were made.

The liver was subjected to sixteen treatments which are outlined in Table 1. It will be noted that analyses were made to determine the effect on B-vitamin content of freezing, of storing frozen, of slicing before and after freezing, of cooking with and without thawing, and of precooking.

All slices or pieces of liver to be frozen were wrapped separately in polyethylene wraps and placed on the bottom of a common household freezer set to maintain a temperature of 0° to −5°F. Slices to be analyzed to learn the effect of freezing alone, without subsequent storage, were held only 48 hr. All others were stored for sixty days in the same freezer in which they were frozen.

Samples frozen for 48 hr. were analyzed raw while still frozen and after cooking from the frozen state to avoid the effects of thawing.

For thawing, samples were placed after unwrapping in large glass funnels which were then covered with tight, moisture-vaporproof covers. Free flow of drip was facilitated by placing glass rods around the sides of the funnels to keep the thawing meat from sealing off the sides and outlets. Each funnel was placed in a tared, stoppered, Erlenmeyer flask to collect drip and prevent evaporation loss. Funnels were allowed to remain at room temperature for 4 hr. and were then placed in a refrigerator set at approximately 40°F. for an additional 20 hr.

In calculating the percentage of drip, the weight of the meat as it came from the freezer was used as 100 per cent, and the amount of drip collected in the flask was weighed. Drip was analyzed separately from meat samples to estimate what the nutrient loss would be if discarded.

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[1] Condensed from a thesis submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, Columbia University. This research was supported by a grant from *House Beautiful* magazine. Received for publication April 4, 1954.

The liver slices were cooked in margarine melted in a pan over a low gas flame. Five min. cooking time were allowed for thawed slices, 6 min. for frozen liver.

Experiment 2. The above procedure of sampling introduced two undesirable variables, namely, differences due to livers and differences between slices within the same liver. (Differences in replications were ruled out by subjecting the various variances to Bartlett's test.) Therefore, a second experiment was conducted to eliminate these variables, at the same time obtaining information on the progressive changes in nutrient content of the liver during frozen storage. It also provided an opportunity to determine whether oxidative-enzymatic processes during storage were in any way responsible for some of the changes in Experiment 1.

In Experiment 2, two fresh calves' livers, one for each replication, were finely ground (separately) to form homogeneous masses. Thus differences between livers and between slices were eliminated. To minimize oxidation during grinding, the liver was kept cold and ground quickly under a small tent filled with carbon dioxide. The ground liver was thoroughly mixed to insure homogeneity, and approximately 40 gm. were placed in each of ninety-six aluminum dishes previously filled with carbon dioxide. All dishes were then sealed with air-tight lids and wrapped in double thicknesses of 100-gauge aluminum foil. Half of the samples were dropped into a boiling water bath and heated until the water was above 170°F. for 20 min. All samples were then frozen, except the fresh raw and cooked, which were analyzed without freezing.

Eight treatments were used in Experiment 2, which are also detailed in Table 1.

Freezing procedures were the same as in Experiment 1. Thawing, however, was done in the sealed container entirely in a refrigerator (about 40°F.) in contrast to thawing partially at room temperature in Experiment 1.

Because grinding the liver produced a spongy, homogeneous mass, from which no drip separated, no drip samples were obtained, with one exception: a few days after a raw, thawed ground sample had been analyzed and the unanalyzed portion had been placed in the refrigerator in its sealed container, it was noted that about 1 cc. drip had accumulated. This drip was saved and analyzed.

Analytical Procedures

Prior to analysis, all samples for both experiments were finely ground in a Waring Blendor. The digestion procedure was that recommended by the Association of Vitamin Chemists, Inc. (1) for analyses of thiamine, riboflavin, and niacin. After hydrolysis of the sample with 0.1 N hydrochloric acid in a boiling water bath for 1 hr., cooling at 37°C., and then neutralizing with 0.2 N sodium acetate to a pH of 4.5 to 4.7, a phosphatase was added and the digestion continued at 37°C. for 12 hr. Portions of this digest were then taken separately for the specific analysis of thiamine, riboflavin, or niacin. For thiamine, the thiochrome method was used, and for riboflavin, the fluorometric method, both as recommended by the Association of Vitamin Chemists, Inc. (1). For niacin, two methods were used, both recommended by the same association: in Experiment 1, the colorimetric method (Method I) was employed, while in Experiment 2, the microbiologic technique.

MUSCLE MEATS

This experiment was designed to learn the extent of loss of nutrients from drip of frozen cuts of muscle meats when thawed prior to cooking. Pork chops, pork tenderloin, a loin of pork roast, beef rib steaks, a beef rib roast, a beef shoulder blade roast, short ribs of beef, lamb stew meat, and a leg of lamb roast were frozen for sixty days as in the first two experiments.

Preparation of the samples in funnels for thawing was also similar. Thawing took place in a refrigerator set to maintain a temperature of approximately 40°F. with one exception: two beef rib steaks of a group of five were thawed at room temperature. Meat items were considered thawed when they registered at their center 34°F. or above. Thawing time was regulated so that the time between complete thawing and cooking was short.

Analyses were made of samples of the raw meats prior to freezing and for drip after thawing. All drip and meat samples were analyzed in duplicate. The thiochrome method was used for thiamine, the fluorometric method for riboflavin, and the microbiologic method for niacin—all as recommended by the Association of Vitamin Chemists, Inc. (1).

Results

LIVER

In Experiment 1, raw liver during sixty days' frozen storage lost an average of 27 and 34 per cent respectively of its thiamine and riboflavin, but the measurable niacin increased 10 per cent. In Experiment 2, losses in all three vitamins occurred as follows: thiamine, 15 per cent; riboflavin, 13 per cent; and niacin, 1 per cent. These differences were large enough to suggest that oxidation may have played a part in the changes during the first experiment.

In Experiment 1, the loss of thiamine during thawing raw frozen liver stored for sixty days averaged 20 per cent, while the measurable quantity of riboflavin and niacin increased 4 and 20 per cent, respectively. In Experiment 2, losses during thawing of raw liver after sixty days' storage were: thiamine, 6 per cent; riboflavin, 10 per cent; and niacin, 10 per cent. Since these samples lost no drip, smaller

TABLE 1

*Retention of thiamine, riboflavin, and niacin in calves' liver**

FREEZING TREATMENT	CONDITION OF SAMPLE AT ANALYSIS	THIAMINE		RIBOFLAVIN		NIACIN	
		Content	Retention	Content	Retention	Content	Retention
		Experiment 1—Sliced Liver†					
		mg./100 gm.	%	*mg./100 gm.*	%	*mg./100 gm.*	%
None	Raw	0.75	100	8.2	100	15.5	100
	Cooked	0.64	85	7.7	94	13.4	87
Sliced fresh, frozen 48 hr.	Frozen, raw	0.73	111	8.7	106	17.4	112
	Cooked without thawing	0.60	77	9.2	116	13.2	85
Sliced fresh, frozen 60 days	Frozen, raw	0.51	68	5.3	65	16.4	106
	Thawed, raw	0.40	53	5.8	72	23.4	151
	Cooked without thawing	0.38	49	5.4	66	13.2	85
	Cooked after thawing	0.34	45	6.2	79	20.2	130
Piece frozen 60 days, sliced frozen	Frozen, raw	0.59	78	5.6	67	17.6	114
	Thawed, raw	0.41	54	5.5	66	20.1	130
	Cooked without thawing	0.44	58	5.8	70	15.7	101
	Cooked after thawing	0.35	47	5.6	67	19.0	123
Piece frozen 60 days, thawed, then sliced	Thawed, raw	0.29	39	6.3	77	20.3	131
	Cooked after thawing	0.32	43	5.7	69	17.5	113
Precooked, frozen 60 days	Frozen	0.29	39	4.9	59	13.8	89
	Rewarmed	0.35	47	6.0	72	14.4	93
		Experiment 2—Ground Liver					
None	Raw	0.81	100	12.2	100	60.8	100
	Cooked	0.68	84	10.5	86	61.6	101
Frozen, stored 30 days	Frozen, raw	0.73	90	10.6	87	64.4	106
	Thawed, raw	0.65	79	11.4	93	68.2	112
	Thawed, precooked	0.66	81	10.3	85	60.0	99
Frozen, stored 60 days	Frozen, raw	0.69	85	10.6	87	60.1	99
	Thawed, raw	0.64	79	9.4	77	54.2	89
	Thawed, precooked	0.61	76	0.3	76	57.2	94

* Dry basis.

† Values given for this experiment are averages for only two replications, although for the first four treatments, data were obtained for four replications.

losses were expected, although this proved true only for thiamine.

The measurable quantity of niacin in Experiment 1 increased during sixty days' frozen storage and again after thawing. In Experiment 2, an indicated increase was also found in the raw samples after thirty days' storage, both in the frozen state and after thawing. But, by the end of sixty days' storage, this gain was more than offset by a loss; in the thawed samples, a 10 per cent loss was noted. Thus, while the results in Experiment 2 for thirty days' storage were consistent for niacin with those in Experiment 1, the results after two months' storage were not.

Riboflavin findings were somewhat contrary to what was expected. In Experiment 1, raw liver slices frozen and stored sixty days and those cooked after thawing had higher apparent riboflavin values than before these treatments. Other investigators have also noted increases in riboflavin after cooking raw meat (2–4).

In Experiment 2, after thirty days' storage, raw thawed liver had more measurable riboflavin than before thawing, but no gain appeared after sixty days' storage and thawing; instead, a noticeable loss of riboflavin in thawing occurred—a much larger loss than was anticipated considering the stability shown in thawing during Experiment 1.

The treatment of freezing 48 hr. in Experiment 1, followed by cooking in the frozen state caused a greater loss of thiamine than cooking fresh liver. This may indicate that in some manner, freezing makes thiamine more labile in subsequent cooking.

TABLE 2

Computed F ratios for Experiments 1 and 2 for hypotheses tested in subdividing treatment sum of squares

HYPOTHESIS TESTED	COMPUTED F RATIO		
	Thiamine	Riboflavin	Niacin
Experiment 1			
Freezing fresh liver 48 hr. caused no change in vitamin value	3.72	0.09	0.28
There was no interaction between cooking liver and freezing liver 48 hr.	3.57	1.44	0.0002
Cooking fresh liver caused no change in vitamin content	22.85*	1.63	46.96*
Storing liver 60 days caused no change in vitamin content	46.83*	117.84*	—
Thawing frozen liver caused no change in vitamin content	18.69*	0.18	—
Slicing fresh liver and freezing it for 60 days was equal to freezing liver in a piece 60 days and subsequently slicing it frozen	2.88	0.38	—
Freezing liver in a piece for 60 days and subsequently slicing it frozen is equal to freezing liver in a piece 60 days and slicing it after thawing	32.94*	1.71	—
Sliced frozen liver cooked after thawing is equal in vitamin content to sliced frozen liver cooked unthawed	3.81	—	—
Liver frozen in a piece, sliced frozen, and cooked after thawing is equal in vitamin content to liver frozen in a piece, sliced frozen, and cooked unthawed	4.37*	—	—
Cooking fresh liver and freezing it 60 days is equal to freezing raw liver 60 days and subsequently cooking it	0.46	0.31	—
Experiment 2			
Cooking ground fresh liver caused no change in vitamin content	12.40*	8.65*	0.16
Freezing raw ground liver 30 days caused no change in vitamin content	5.13*	7.87*	3.14
Freezing raw ground liver 60 days caused no change in vitamin content	10.78*	7.46*	0.53
Freezing cooked ground liver 30 days caused no change in vitamin content	0.50	0.19	0.56
Freezing cooked ground liver 60 days caused no change in vitamin content	3.15	7.14*	4.62*
Thawing raw ground liver caused no change in vitamin content	6.50*	0.46	0.52

* Hypothesis rejected. There was a significant difference at the 5 per cent level between samples tested.

Of the three vitamins studied, riboflavin showed the greatest loss during frozen storage in Experiment 1, but the quantity lost in thawing was considerably less than that of thiamine.

The results were analyzed statistically to determine the significance of all treatments in both experiments. By analysis of variance, it was found that in almost every instance, significant differences in the thiamine, riboflavin, and niacin content were caused by the various treatments in both experiments. Limitations of space prevent detailed presentation of these results. To learn further the effect of specific treatments, the treatment sum of squares for each vitamin was subdivided, and the *F* ratio was computed and tested for significance. Table 2 summarizes the results of these statistical calculations. For Experiment 1, comparisons in some instances were omitted for niacin, since increases during storage and thawing made them useless.

As far as the effects of treatments is concerned, these statistical analyses indicate comparable findings in Experiments 1 and 2, even though specific results reported in Table 1 varied somewhat. Thus, cooking fresh liver, whether sliced or ground, resulted in significant losses of thiamine in both experiments; freezing both slices and ground liver for sixty days caused significant losses of both thiamine and riboflavin; and thawing frozen liver caused significant losses of thiamine.

Several other findings which were not duplicated in either experiment are of interest.

In Experiment 2, after thirty days' storage of *raw* ground liver, significant losses of both thiamine and riboflavin were indicated. Further significant quantities of thiamine were lost during the second thirty-day storage period, but not of riboflavin, indicating that loss of thiamine during storage was progressive, but not of riboflavin, a conclusion which agrees with the findings of Lehrer *et al.* (5).

During thirty days' storage of *cooked* ground liver (Experiment 2), no significant change in any of the three vitamins occurred, but after sixty days, riboflavin and niacin losses were significant.

The statistical comparisons (Table 2) of the effects of cooking in the frozen state vs. thawing prior to cooking (Experiment 1) are somewhat confusing, although not totally contradictory. When cooking in the frozen state and thawing before cooking for the sliced, frozen liver were compared, an *F* value of 3.81 (which closely approaches but did not reach the 3.99 needed for significance) for thiamine was obtained. Comparison of the two techniques for liver frozen in the piece and sliced frozen gave an *F* value of 4.37, which was more than sufficient to indicate a significant difference in favor of cooking in the frozen state. In view of actual losses (Table 1), these comparisons suggest that careful consideration be given to the method of handling frozen meat

TABLE 3

Quantity and vitamin value of drip in Experiment 1*

REPLICATION	DRIP	THIAMINE		RIBOFLAVIN		NIACIN	
		Drip	Meat after drip was lost	Drip	Meat after drip was lost	Drip	Meat after drip was lost
Liver Sliced Fresh, Frozen 60 Days							
	%†	*mg./100 gm.*	*mg./100 gm.*	*mg./100 gm.*	*mg./100 gm.*	*mg./100 gm.*	*mg./100 gm.*
I	12	—	—	—	—	—	—
II	15	—	—	—	—	—	—
III	14	0.66	0.66	8.1	13.2	43.7	27.9
IV	12	0.81	0.60	2.0	6.6	49.2	51.3
Liver Frozen 60 Days in Piece, Sliced Frozen							
I	10	—	—	—	—	—	—
II	12	—	—	—	—	—	—
III	14	0.59	0.59	7.3	11.4	34.2	31.1
IV	14	0.64	0.64	1.4	5.0	44.8	31.1
Liver Frozen 60 Days in Piece, Thawed, Then Sliced							
I	8	—	—	—	—	—	—
II	10	—	—	—	—	—	—
III	11	0.40	0.71	6.6	15.2	27.0	30.3
IV	11	0.47	0.62	2.4	8.1	25.6	37.9

* Dry basis.

† Using weight of meat as it came from the freezer as 100%.

after its removal from the freezer, if conservation of nutrients is to be one object in cooking. This is particularly true in view of the large and variable loss in thiamine which occurs in cooking. The somewhat comparable findings of Lehrer *et al.* (5) with frozen pork chops serve to support this word of caution.

Also, a significant amount of thiamine was lost in thawing raw ground liver in Experiment 2. This is difficult to explain, since no drip was obtained, unless thiamine is labile in the thawing process itself. On the other hand, since no significant losses of riboflavin and niacin were obtained in thawing in Experiment 2, it must be concluded that losses of these vitamins during thawing must be due solely to loss by drip.

DRIP VALUES IN LIVER

Because of the significant loss, particularly of thiamine, during thawing, the figures on drip are of special interest.

The average percentage of solids in fresh liver was 31.3, whereas the solid content of drip from samples subjected to three treatments was about two-thirds of that figure. Specifically, solid content of drip for: liver frozen in slices and thawed, liver sliced from a frozen piece, and liver thawed in a piece and then sliced averaged 19.7, 20.7, and 21.1 per cent, respectively.

As expected, a greater percentage of drip exuded from frozen slices than from frozen pieces, since the slices had a greater cut surface area per volume and therefore a larger broken area of damaged cells from which to lose drip. Table 3 presents figures on the percentage of drip, as well as vitamin content of both the drip and its source after thawing.

In general, the samples of drip had gram for gram about as much or slightly more thiamine, slightly less riboflavin, and about as much or slightly more niacin than remained in the source of the drip after thawing.

In Experiment 2, only one sample of drip, measuring 1 cc., was obtained, as explained earlier. This sample contained 1.0, 7.0, and 93.0 mg. per 100 gm. (dry basis) of thiamine, riboflavin, and niacin, respectively. In contrast, the content of the thawed liver before the drip occurred was 0.8, 10.0, and 59.6 mg. per 100 gm., respectively. Thus, as in Experiment 1, this sample of drip had slightly more thiamine and niacin and less riboflavin than the meat from which it came. However, in Experiment 1, the comparison was made with meat after the drip had occurred, whereas the thawed meat in Experiment 2 had been analyzed before the drip was obtained.

DRIP LOSS IN MUSCLE MEATS

Table 4 details the percentage loss of drip and vitamin values of five cuts of beef, three of pork, two of lamb, and one of calves' liver. For comparative purposes, the vitamin contents of the raw meat before freezing are also presented.

The quantity of drip from liver slices in this experiment was smaller than in Experiment 1. This difference may have been due to the fact that thawing took place solely in the refrigerator, whereas in Experiment 1, it occurred partially at room temperature.

TABLE 4

Quantity and nutritive value of drip in various cuts of muscle meats and calves' liver†*

CUT OF MEAT	DRIP	THIAMINE		RIBOFLAVIN		NIACIN	
		Drip	Raw meat prior to freezing	Drip	Raw meat prior to freezing	Drip	Raw meat prior to freezing
Calves' Liver							
	%‡	*mg./100 gm.*	*mg./100 gm.*	*mg./100 gm.*	*mg./100 gm.*	*mg./100 gm.*	*mg./100 gm.*
Slices	7.0	0.22	0.22	2.5	2.1	18.3	18.3
Beef							
Blade roast	2.2	0.14	0.06	0.2	0.2	6.4	4.5
Shortribs	0.9	0.14	0.06	0.2	0.2	6.4	4.5
Rib steaks§	6.3	0.16	0.06	0.2	0.2	6.7	4.5
Rib steaks	5.7	0.15	0.06	0.3	0.2	7.1	4.5
Rib roast	3.2	0.10	0.06	0.2	0.2	7.4	4.5
Pork							
Tenderloin¶	1.4	0.71	1.10	0.1	0.2	2.8	5.4
Loin roast	1.9	1.24	1.10	0.3	0.2	4.4	5.4
Chops	2.0	1.30	1.10	0.3	0.2	4.1	5.4
Lamb							
Leg roast	2.2	0.18	0.17	0.2	0.3	8.6	5.2
Stew	1.0	0.15	0.17	0.2	0.3	8.7	5.2

* Moist basis.

† All samples held in frozen storage for 60 days and thawed in refrigerator except as noted. The meat samples in this experiment were supplied by Swift & Company.

‡ Using weight of raw meat before freezing as 100%.

§ Thawed at room temperature.

¶ Held in frozen storage for only 19 days.

It appears from the figures that the ratio of bone and fat to lean meat in the muscle meats was one factor governing the quantity of drip. Shortribs of beef, where the ratio is high, had a lower percentage of drip (0.9) than steaks or roasts (average, 4.3) for which the ratio is low. Likewise, in lamb stew (high ratio), the drip loss was less than in lamb roast with a lower ratio.

Another influencing factor seemed to be the ratio of cut surface to volume of meat. In roasts, less weight was lost by drip than in chops, steaks, or smaller cuts. This was found to be true in Experiment 1 also, where slices of liver lost more drip than liver thawed in the piece.

The cut or type of meat also apparently determined drip loss. This author has observed frequently that drip losses from glandular meats are usually much larger than those from muscle meats.

There also seemed to be a specie difference. The thiamine and niacin contents of drip from beef cuts and the niacin content of the lamb drip were higher than for the raw meat sources. For pork, however, the source contained more niacin and approximately the same amount of thiamine. For all three species, riboflavin values were quite similar in both source and drip.

The percentage of drip losses was so small in these cuts that, if household and institutional losses are only of this magnitude generally, it is doubtful whether nutrient losses by drip, even if it is discarded, would be of importance. However, the percentages reported in the literature by other investigators have been somewhat higher for similar meats (6).

Analyses for thiamine, riboflavin, and niacin of the drip obtained in this experiment indicated that about the same or slightly more thiamine and niacin and about the same amount of riboflavin will be found in the drip as in the source of the drip before freezing. For the most part, these results parallel closely those in Experiments 1 and 2.

ORGANOLEPTIC PREFERENCES

An expert panel of tasters was selected to learn whether a difference in flavor of meat cooked after thawing or in the frozen state could be determined. (The method of selection and an evaluation of the tasters' performance will be reported later.) "Triangle testing" (7) was used, in which three samples of cooked meat were given to each judge. Two of these samples were taken from the same piece of meat, while the third came from another piece. Thus, in each test, the judge had one chance out of three of making a correct selection as to which two of the three samples were alike.

Judges were also asked to record the sample (or

samples) they preferred. If, in naming two samples, a judge preferred two which were not from the same piece of meat, his selection was classified as "no preference." If he chose samples which were paired mates, the preference was listed under the respective heading of "meat cooked unthawed" or "meat cooked thawed."

Judges were asked to make pairings and give preferences for the following cuts: beef pot roast, grilled calves' liver, braised shortribs of beef, pork chops, pork roast, lamb stew meat, lamb roast, beef rib steaks, and beef rib roast.

To a very significant degree (as determined by a Chi-square test), the judges were able to tell the difference between meat cooked from the frozen and meat cooked from the thawed state. Also, of twenty-nine preferences expressed, twenty-one (which was significant at the 5 per cent level by the Chi-square test) chose meat cooked unthawed. Only eight preferred meat cooked after thawing.

Despite the significance of these findings, it must be noted that since these judges were considered to form an "expert" panel, their choices may have little meaning insofar as they predict the preference of the general public. No tests were made to learn whether these judges were representative of a large population. Perhaps they were, but this is not known. To obtain such data, a consumer panel composed of many "average" tasters would be needed.

In determining preferences in Experiment 1, judges also stated that the samples cooked unthawed seemed more moist. In comparing precooked frozen liver with cooked fresh liver, they found both to be equally acceptable, except that some of the precooked samples had a slightly rancid taste.

Discussion and Recommendation

Pros and cons can be set forth in favor both of cooking frozen meat in the frozen state and of cooking after thawing. The data presented in this study would indicate that cooking in the frozen state would save nutrients and might thus be recommended. However, since certain disadvantages might make this undesirable, it is possible that a compromise technique might combine the advantages of both methods.

Lowe *et al.* (5) have shown that cooking meats from the frozen state requires more fuel than cooking after thawing. Cooking frozen meat also requires more time, and it is sometimes not convenient or economical, either in the home or institution, to devote an oven solely to the cooking of one item. On the other hand, the time element required to thaw meat must be considered in the over-all preparation time schedule.

With small cuts of meat, other problems arise in cooking meat in the frozen state. If the meat is to be sautéed or browned, there is the problem of spattering until the meat is partially thawed. Also, a large number of pieces of frozen meat placed on a griddle, in a frying pan, or under a broiler will reduce cooking temperatures to the point where best results are not obtained. In broiling, too, there is the problem of adjusting the heat to avoid overcooking the outer surface before the interior is cooked. Items that must be breaded and then cooked cannot be breaded in the frozen state, for the breading mixtures as prepared in the home or institutional kitchen will not adhere during cooking. On the other hand, roasting or boiling meat while still frozen presents few problems and is as easy as with thawed or fresh meat.

Weight loss in smaller cuts of meat cooked in the frozen state is greater, probably due to the longer cooking time, than when they are thawed before cooking. For larger cuts, however, some investigators have reported that less weight is lost in cooking without prethawing, apparently due to the fact that the flow of juices from the frozen interior is retarded during part of the cooking.

The problem of personnel in the institution kitchen must also be considered in deciding which method would be best. Most cooks dislike to change methods, and since thawed meat appears similar to fresh meat which they know, many would probably prefer to cook meat which has been thawed.

Consumer acceptance must also be considered. Some workers have indicated that meats cooked from the frozen state are juicier than meat cooked after thawing, but for the most part, studies have shown little difference in flavor, juiciness, or appearance in the finished products. In this study, the taste panel indicated a preference for meat cooked in the frozen state, which was found to be significant at the 5 per cent level of probability.

These experiments have indicated that the major loss of vitamins in frozen meat occurs during frozen storage and during thawing, the latter loss being due largely to drip. Although little can be done to prevent the loss during frozen storage—at least as far as we know at this time—cooking meat in the frozen state would avoid the vitamin losses during thawing. This method, however, would have disadvantages, as outlined above.

It is possible, on the other hand, that cooking meat which has been partially thawed might circumvent some of these disadvantages, at the same time preventing the losses of the B vitamins which occur in thawing.

It is known that the rise in temperature in frozen meat after removal from the freezer is fairly rapid up to 29°F. Then, because of the large amount of heat needed to change solid ice crystals to liquid (heat of fusion), the temperature remains constant until this heat is absorbed. After that, the temperature again begins to rise, and it is during the second rise that the ice crystals melt and drip begins, gradually increasing as the meat thaws.

In smaller cuts of meat, the disappearance of surface ice crystals, the beginning of drip, and the second temperature rise occur almost simultaneously. However, in larger cuts, the second rise in temperature in the center is delayed. When this second rise occurs, the entire crystal structure in the meat begins to disintegrate, and under some pressure of the finger, the meat will yield slightly. At this point the meat can be sliced easily without the use of a mechanical device such as the electric saw. In fact, butchers often slice frozen liver at this point.

Since little more heat is then needed to thaw the meat completely, starting the cooking at this time would probably eliminate many of the objections to cooking it from the hard-frozen state. Further research would indicate the desirability and practicality of such a procedure in actual cooking operations.

Summary

Retention of thiamine, riboflavin, and niacin under various treatments of freezing, storing, thawing, and cooking of calves' liver and certain muscle meats was studied. In general, greatest vitamin loss occurred in raw liver during frozen storage and during thawing prior to cooking. Slightly more thiamine and riboflavin were retained in liver cooked in the frozen state than in liver cooked after thawing. A greater quantity of niacin remained in liver cooked after thawing than in liver cooked without thawing.

Freezing precooked liver slices for sixty days destroyed no more thiamine and riboflavin than freezing raw liver for sixty days and then cooking it. Niacin did not increase during frozen storage of precooked liver as it did in raw liver.

The percentages of drip obtained from liver, steaks, and some roasts were high enough to indicate significant losses during thawing, although for certain other muscle meats, significant quantities of drip were not obtained. The drip from thawed meats usually had, gram for gram, an equal quantity or slightly more thiamine and niacin, and slightly less riboflavin than the source of the drip after thawing.

A significant number of expert taste panel members were able to detect a difference between meat samples cooked in the frozen state and those thawed prior to cooking. The judges preferred the meat cooked without thawing.

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World Caloric Consumption

Europe and North America, by and large, are the most fortunate of the continents as far as food availability is concerned. According to the new *Statistical Yearbook* of the United Nations, only four countries not on these continents have available to their populations more than 2800 calories per day—Argentina, Australia, New Zealand, and Uruguay. The following are the categories, according to calories per capita (generally 1952 or 1952–53):

3000 calories or over: Argentina, Australia, Canada, Denmark, Finland, Iceland, Irish Republic, New Zealand, Norway, Sweden, Switzerland, United Kingdom, and United States

2800–2999 calories: Belgium-Luxembourg, France, Germany, Netherlands, and Uruguay

2600–2799 calories: Austria, Cuba (1948–49), Czechoslovakia (1948–49), Turkey, and Union of South Africa

2400–2599 calories: Cyprus (1948–49), Greece, Israel, Italy, and Southern Rhodesia

2200–2399 calories: Brazil, Chile, Colombia (1948–49), Egypt, Japan, Mauritius (1948–49), Portugal, and Venezuela

2000–2199 calories: Honduras and Pakistan (1948–49)

Under 2000 calories: Burma (1947–48), Ceylon, and India

Cooked, Edible Meat in Parts of Chicken[1]

I. Broilers

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ANNUAL per capita consumption of poultry meat in the United States increased 78 per cent between the periods 1935–9 and 1951–3 while red meat consumption increased only 15 per cent (1). The increase in consumption of poultry meat has been due to industry changes which have kept it relatively cheap and made it readily available at all times in ready-to-cook condition and purchasable as cut-up parts.

Many studies have been reported on the dressing and eviscerating losses in processing chickens, and a few studies (2–5) have been published on the percentage of parts of cut-up chickens. Several reports have been made on the percentage of edible raw meat in chickens. Most of them have been reviewed recently by Hathaway *et al.* (6). The percentage of cooked edible meat in ready-to-cook chickens has also been reported, and these studies have been reviewed by Stotts and Darrow (7). No published information has been found by the authors listing the cooking losses and percentage of edible meat of parts of chicken broilers.

Housewives, dietitians, restaurant operators, and others are interested in the "best buys" in chicken parts because of their widespread availability and great variability in prices.

The objectives of this study have been to obtain dressing and evisceration losses of three meat-type broiler crosses, the percentage of cut-up parts, cooking losses, and percentage of edible meat of the various parts.

PROCEDURE

Chickens

Ten-week-old, meat-type broilers were used. Three groups were tested: dominant White Plymouth Rocks developed from White Leghorns crossed with Barred Plymouth Rocks, Red Cornish crossed with New Hampshires, and Delawares crossed with New Hampshires. Ten males and ten females were selected at random from one-hundred-bird lots of each cross used. The average live weights of the birds at time of slaughter were: White Rocks, 3.44 lb.; Cornish × New Hampshire, 3.42 lb.; and New Hampshire × Delaware, 3.44 lb.

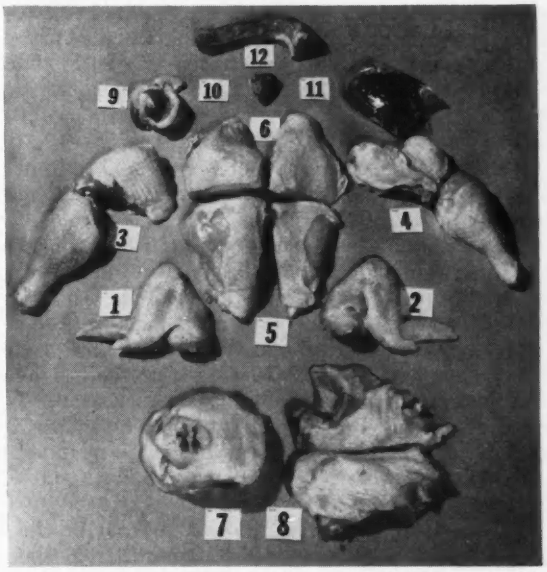

FIG. 1. *Cut-up parts of a chicken: 1 and 2, wings; 3 and 4, legs and thighs; 5 and 6, breast; 7 and 8, back; 9, gizzard; 10, heart; 11, liver; and 12, neck.*

Feed but not water was removed from the birds 12 hr. before slaughter. The birds were weighed, bled, scalded at 128°F. for 45 seconds, picked on a mechanical picker, singed, and weighed again to determine dressing loss. They were then cooled in cold (60°F) running tap water and eviscerated

[1] This study was made possible in part by a grant-in-aid to the Institute of Nutrition and Food Technology, Ohio State University, by the Poultry and Egg National Board. Received for publication January 24, 1955.

TABLE 1

Dressing and evisceration losses

TYPE OF FINISHING	AVERAGE LOSS	
	Males	Females
	%	%
Dressing	10.9	12.0
Evisceration		
Based on live weight	26.0	24.4
Based on dressed weight	17.0	14.3

TABLE 2

Weight distribution of parts of ready-to-cook broilers

PART	PERCENTAGE OF TOTAL READY-TO-COOK WEIGHT
Legs and thighs	31.5
Breast	25.1
Back	18.2
Wings	13.1
Neck	4.9
Gizzard	3.8
Liver	2.8
Heart	0.6

according to the method suggested for roasters by the United States Department of Agriculture (8). They were washed and drained and the giblets wrapped and inserted with the neck in the body cavity. The birds were weighed again to determine evisceration loss. They were then packaged in moisture-proof bags under vacuum and overwrapped with butcher paper. The birds were frozen at −20°F. and held at 0°F. for about two months before analysis.

Preparation and Cooking

The day before cooking, the birds were taken from the freezer and the overwrap removed. They were allowed to defrost overnight in the moistureproof bag in a can under a faucet of cold (60°F.) running tap water. The birds were cut into parts as described by the United States Department of Agriculture (8) for fowl (*Fig.* 1). The parts, including giblets and neck, were wrapped separately in tared pieces of heavy aluminum foil. However, the legs and thighs and the wings were wrapped in pairs. Each wrapped piece was weighed on a torsion balance and placed on a rack in a large roasting pan. All of the wrapped pieces were cooked together in the pan in an autoclave at 15 lb. pressure for 20 min.

The cooked parts were allowed to cool in the wrappers for 10 min., following removal from the autoclave. Each package was then opened momentarily to drain out any accumulated fluid, closed, and again weighed to determine cooking loss. The edible meat of each piece, including skin but not cartilage and tendons, was removed by hand and the bones weighed. The difference between the weight of cooked parts before and after bone removal was considered as the cooked edible meat. When calculating the cooked edible meat of the carcass, the skin and giblets but not the neck were included.

TABLE 3

Cooking loss in ready-to-cook broilers

OBSERVATION	LOSS	
	Males	Females
	%	%
Over-all weight	23.0	25.8
Fat in drippings	0.8	1.0
Total drippings	6.4	7.0

TABLE 4

Cooking loss in parts of broilers

PART	LOSS
	%
Gizzard	41.4
Liver	33.2
Heart	32.8
Neck	29.2
Back	24.0
Breast	24.0
Legs and thighs	23.9
Wings	16.1

The total drippings were poured from the pan into a tared graduated cylinder and weighed. The number of milliliters of fat that collected on top of drippings was recorded. This volume of fat multiplied by the specific gravity of chicken fat gave the weight of fat rendered out in the process.

RESULTS

Dressing and Evisceration Losses

The data have been summarized in Table 1. The average dressing loss for all sixty birds was 11.5 per cent. It was approximately 1 per cent greater for females than for males. The evisceration loss based on live weight for all birds was 25.2 per cent. It was greater for males than females. Hathaway *et al.* (12) reported 27.3 per cent evisceration loss, based on live weight of broilers.

The weight distribution of parts in ready-to-cook broilers is shown in Table 2. The data are in close agreement with that reported by Jull *et al.* (2). Legs and thighs constituted 32.4 per cent of the carcass in males and 30.6 per cent in females, while the breast constituted 25.6 per cent in the females and 24.5 per cent in the males.

Cooking losses of ready-to-cook broilers are shown in Table 3. Average cooking loss, based on ready-to-cook weight, was 24.4 per cent for all broilers. Lowe and Vernon (9) reported a cooking loss of 25 per cent. The cooking loss was greater for females than males, since they lost more in the form of total drippings and fat.

In Table 4, data on the cooking losses of cut-up parts of broilers are shown. The fleshy pieces had

TABLE 5

Cooked, edible meat yield of the parts of broilers

PART	YIELD		
	Average*	High	Low
	%	%	%
Legs and thighs	53.3	58.5	47.5
Back	41.7	52.0	26.7
Wings	50.0	56.6	39.0
Breast	63.4	74.1	57.9
Gizzard	58.6	74.2	46.6
Heart	67.2	90.7	41.3
Liver	66.8	78.3	41.4

* Average of sixty broilers which varied in strain, sex, weight, and finish.

greater cooking loss than the more bony ones. It ranged from 16.1 per cent in wings to 41.4 in the gizzard.

The cooked edible meat yield of the broilers amounted to approximately 37.5 per cent of the live weight, 42.5 per cent of the dressed weight, and 51.4 per cent of the drawn weight. Lowe and Vernon (9) reported similar data.

There were no significant differences in percentage of edible meat in the different broiler strains. These data are in agreement with the recent work of Morrison *et al.* (10). There was also no difference in the percentage of cooked edible meat yields of males and females. Hathaway *et al.* (6) obtained a greater percentage of raw meat yields from females than males. Our data (Table 3) show greater cooking losses of meat from females than males. This probably balances the greater original raw meat yields of the females, so that essentially there is no difference in cooked edible meat yields of male and female chicken broilers.

The percentage of cooked edible meat yields of the cut-up parts of the broilers are summarized in Table 5. The largest percentage of edible meat is obtained, in decreasing order, from the giblets, breast, legs and thighs, wings, and back (*Fig.* 2). The wide variations in yields from corresponding parts of different birds may be accounted for from the range in live weight (2.8 to 4.3 lb.), finish, sex, breed, variations in cutting up the birds, and completeness of meat removal from the bones.

SUMMARY

Dressing and evisceration losses, percentage of cut-up parts, cooking losses, and percentage of edible meat of parts were determined on ten-week-old, meat-type broiler crosses averaging 3.4 lb. live weight.

The dressing loss was 11.4 per cent, while the evisceration loss based on live weight was 25.2 per cent, and on dressed weight, 15.6 per cent.

The dressing loss, percentage wise, was greater for females than males while the evisceration loss was reversed.

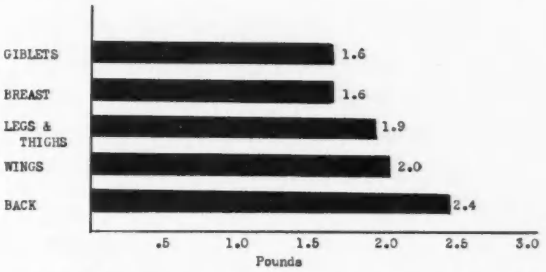

FIG. 2. *Number of pounds of cut-up parts of poultry required to produce 1 lb. cooked, edible chicken meat.*

Legs and thighs constituted 31.5 per cent of the eviscerated weight of broilers; breast, 25.1 per cent; back, 18.2 per cent; wings, 13.1 per cent; liver, 4.9 per cent; gizzard, 3.8 per cent; neck, 3.4 per cent; and heart, 0.63 per cent.

Cooking loss amounted to 24.3 per cent, based on eviscerated weight, when wrapped in foil and autoclaved at 15 lb. pressure for 20 min. The percentage cooking loss of females was greater than for males.

The percentage cooking losses for parts were: gizzard, 41.4; liver, 33.2; heart, 32.8; neck, 29.2; back, 24.8; breast, 24.0; legs and thighs, 23.9; and wings, 16.1.

The cooked edible meat amounted to 37.5 per cent of the live weight, 42.5 per cent of the dressed weight, and 51.3 per cent of the ready-to-cook weight of the broilers. There was no significant difference in the percentage of cooked edible meat in the different meat-type broiler crosses or in the different sexes.

The percentage of cooked edible meat obtained from the parts was: heart, 67.2; liver, 66.8; breast, 63.4; gizzard, 58.6; legs and thighs, 53.3; wings, 50; and back, 41.7.

One pound of cooked edible meat may be obtained from 2.67 lbs. of live weight broiler, 2.35 lb. of dressed weight, or 1.94 lb. of ready-to-cook weight. A pound of cooked edible meat may be obtained from: 1.49 lb. raw heart; 1.5 lb. liver; 1.58 lb. breast; 1.71 lb. gizzard; 1.88 lb. legs and thighs; 2.0 lb. wings; and 2.4 lb. backs.

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Recommended Allowances for Australia

Feeling the need for a set of nutritional standards specifically adapted to the environment and local food supplies, the Nutrition Committee of the Australian National Health and Medical Research Council has worked out "Recommended Daily Dietary Allowances for Australia." These were published in July 1954 in *The Medical Journal of Australia*. Prior to that time, recommendations of the Technical Commission of the League of Nations, the National Research Council of the U.S., and the Nutrition Committee, British Medical Association, or adaptations, had been used as guides in planning dietaries and as criteria for assessing diets.

The new Australian standards represent average values for the groups specified. They are based on a "reference man" twenty-five years old, healthy, weighing 65 kg., living in a warm temperate zone with a mean external annual temperature of 18°C. (64°F.), who is moderately active (light industrial work). The "reference woman" would meet the same specifications, except that she would weigh 55 kg. and is engaged in general household duties.

SUBJECTS*	AGE	CALORIES	PROTEIN	CALCIUM	VITAMIN A	THIAMINE	RIBOFLAVIN	NIACIN	ASCORBIC ACID	VITAMIN D
	yr.		*gm.*	*gm.*	*I.U.*	*mg.*	*mg.*	*mg.*	*mg.*	*I.U.*
Men	25	3000	65	0.8	5000	1.5	1.6	15	30	
	35	2900	65	0.8	5000	1.5	1.6	15	30	
	45	2800	65	0.8	5000	1.4	1.6	14	30	
	65	2500	65	0.8	5000	1.3	1.6	13	30	
Women	25	2200	55	0.8	5000	1.1	1.4	11	30	
	35	2100	55	0.8	5000	1.1	1.4	11	30	
	45	2000	55	0.8	5000	1.0	1.4	10	30	
	65	1800	55	0.8	5000	0.9	1.4	9	30	
Pregnant (third trimester)		Add 400	80	1.5	6000	1.3	1.8	13	80	400
Lactating (850 milliliters daily)		Add 1000	100	2.0	8000	1.6	2.0	16	100	400
Infants†	Under 1	60–45 per pound	1.6 per pound	0.6–1.0	1500	0.5	0.9	5	30	400
Children	1 to 4	1300	40	1.0	3000	0.7	1.0	7	30	400
	5 to 8	1700	55	1.0	3000	0.9	1.3	9	30	400
	9 to 12	2300	70	1.2	3000	1.2	1.7	12	30	400
Boys	13 to 15	3000	85	1.4	5000	1.5	1.8	15	50	400
	16 to 19	3600	100	1.4	5000	1.8	1.8	18	50	400
Girls	13 to 15	2500	80	1.4	5000	1.3	1.8	13	50	400
	16 to 19	2300	75	1.4	5000	1.2	1.8	12	50	400

* These allowances are recommended for the planning of practical dietaries for healthy persons, normally vigorous, and living in Australia in a warm temperate climate.

† The recommendations for infants refer to diets consisting mainly of cow's milk; the values do not necessarily apply to breast-fed infants.

Current Comment

Quality Food, Better Health, Greater Production[1]

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During the past few years, industrial feeding operations have come into great importance. This growth has been marked with growing pains from many angles. Probably the most serious mistake in the past has been management's ignorance of proper food management. The belief that anyone can cook and serve food has led to much grief, such as employee dissatisfaction, food illness, and union arguments. John Doe had become a problem child as a production worker and was finally pushed into the cafeteria. All the old "crocks" in the plant eventually were congregated in the same haven of easy work which required no brains, to say nothing of training —the kitchen.

In general, it is safe to say that the feeding problem was for too long considered as a necessary evil which should be executed with a minimum of expense and the lowest possible rate of pay. Obviously, the overall results were in direct proportion to the know-how; absenteeism due to gastrointestinal upsets was high, dissatisfaction great, employee attendance at cafeterias low—and lastly, the point of breaking somewhere nearly even financially was so remote that it was not even approachable.

For many years, we have kept careful records of absenteeism due to illness. Diseases of the respiratory tract are always the most numerous. Next in order of frequency comes disease of the gastrointestinal tract. It is impossible to determine the causative factor in many of these cases, but it is safe to say that too many are due to poor quality food.

VALUE OF IN-PLANT FEEDING

What are the advantages of good quality food in industry? First and most important, it promotes good health and good morale, and this combination leads to less absenteeism and better production. Every industry, in order to continue to exist, must produce a quality product that can be sold at competitive prices. Any interference with production increases the cost of the final product. Every employee has a specific job to do and when absent he costs his company money in production and usually welfare costs as well. Further, the job must go on and usually his associates are called on to take up the slack, since no industry has a group of substitutes waiting for the added burden of work. This adds to the daily fatigue of those who take up the slack, and added fatigue slows up their efficiency.

I feel certain that no one will dispute the statement that an employee who has a good satisfying meal, followed by good digestion, does a much better job than the employee with indigestion from poor quality food. "Some evils admit of consolations, but there are no comforters for dyspepsia and the toothache" (Bulwer).

Feeding operations in industry have long since become a necessity. With the 8-hr. working day and the 30-min. lunch period, it would be impossible for any sizable group to leave the plant, get lunch, and return on time. The box lunch still exists to some extent, but eating at the point of work is no longer permitted in most industries. In the chemical industry, especially, such a practice would be a health hazard since food and chemical compounds mixed, even in minute quantities, make a very dangerous combination.

Feeding facilities in the duPont plants have long been recognized as an important operation and are considered a substantial adjunct to better health, more satisfied employees, and lastly, better production. Our objective is to serve high quality food at prices within the economic reach of all employees. There is no desire to make a profit, but rather to keep the losses down to a reasonable figure.

The Medical Division of duPont has as its principal function the preservation and protection of the health of all the employees. There are seventy duPont plants in twenty-eight states, varying in size of operating personnel from 250 to several thousand. Each plant has its own medical personnel and complete facilities. The central Medical Division in the Company's main office in Wilmington, Delaware, acts in an advisory capacity to all units. Feeding facilities, although not directly under the control of the various medical units, have always been considered an important adjunct to better health, and all plant physicians have been responsible for maintaining sanitary controls. Several years ago, we came to the realization that our feeding operations must be completely reorganized in order to produce quality food, encourage more of our employees to eat at least one good substantial

[1] Presented at the 37th Annual Meeting of The American Dietetic Association in Philadelphia, on October 27, 1954.

meal a day, and thus help promote better health. We realized that, in order to accomplish this task, the first and most important requirement was advisory personnel with proper training and experience who could survey all the feeding operations in the company and point the way to needed improvements.

During World War II, duPont was engaged by our government to build the Hanford Atomic Energy Plant which is located on desert land in the State of Washington, remote from all human habitation. It was necessary to provide barracks, trailer camps, and feeding facilities for the entire construction crew which at one time numbered 65,000. Providing food involved three meals a day for the majority of these workers, since the nearest small town was about 35 mi. away.

In the early days of this enormous project, the feeding facilities were operated by an outside concern. Whether they had ever previously operated such a sizable facility, I do not know. I do know that before long we were in dire difficulties Men were leaving at the rate of 500 a day, most of them complaining about the food. We had a 600-bed general hospital with 70 per cent of the beds occupied by patients suffering with food poisoning. The situation was critical. The project was one of top priority. We were in the middle of a great war, and the food situation had become a serious obstacle. Something had to be done and done quickly. Fortunately, I had on my staff two well trained people who thoroughly understood all phases of food management. Dorothy Milavetz and Beatrice Beall took over, and in an amazingly short time the operation was functioning perfectly. Both are members of The American Dietetic Association, and I take this opportunity to pay special tribute to them.

ADVISORY DUTIES

Since the war, they have been on our Central Medical staff, acting in an advisory capacity to all of our plants with the following results:

(a) They help our engineers plan the layout and equipment for our cafeterias. Our engineers welcome this help, as they have insufficient knowledge and no operating experience to enable them to do this job properly. Our cafeterias are now so designed as to make the operating facilities most efficient. Equipment is not only the best, but also the most suitable. Sanitation is more easily maintained, and faulty technique more readily discernible.

(b) Qualified dietitians have charge of the cafeterias. Consequently purchasing, storage, preparation, distribution, and clean-up operations are properly done.

(c) The quality of the food is good.

(d) A high percentage of our employees eat at our cafeterias because they like the food.

(e) Prices are maintained at a reasonable level and where previously our company lost several hundred thousand dollars each year, the deficit is now reasonable and in some instances, we break even.

(f) Lastly, but importantly, health and morale are better. The time lost because of illness throughout the country is eight days per employee per year; in duPont, it is less than five days. I am not trying to convey the idea that the quality food alone is responsible for our low rate of absenteeism, but I am firmly convinced that it plays a very important part in our over-all health program.

Finally, I would like to mention one more dividend that I believe accrues from having quality food service. Many of our employees become acquainted with quality food, some for the first time, and learn to demand the same type of food in their own homes and when eating in public restaurants. They are able properly to discriminate between the good and the bad and avoid the latter after at least a few experiences. Thus, indirectly we are promoting an educational program quite extensive in scope.

Personnel Relations During Remodeling Operations

HAZEL PARRY[1]

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For thirty-two years, the main kitchen of the Brockton Hospital, Brockton, Massachusetts, had functioned in a corner of the service building. It had a stained and cracked wooden floor, naked light bulbs over inadequate working surfaces, and all the other features of a 1920 hospital kitchen. With the passage of time, the work spaces had become increasingly cramped and overcrowded with workers and materials. Traffic lines crisscrossed, so much that employees had to be careful not to bump someone going by. Use of equipment had to be staggered, and work space was horded for fear someone else would take over the space. The worst part of the working conditions was the effect on employee morale. It was no wonder tempers flared. Remodeling was imperative.

When renovation operations were started, we realized that, although of a temporary nature, the personnel would be under even heavier strains. We were aware that morale was already poor, but we reasoned that with good planning and sympathetic

[1] Present address: Manhattan, Kansas.

supervision, worsening of morale could be prevented, while food service operations continued "under fire." The main problem was to arouse the interest of the employees in the remodeling program, thereby insuring their cooperation. Through many conferences between administration and personnel, we developed a program to accomplish this objective, with the result that we did not miss a single meal service during the entire two-month remodeling program—and the morale of the employees, instead of continuing to be poor, began to improve.

SUGGESTIONS SOLICITED

Our first technique in gaining employee support was to ask each worker for suggestions concerning the remodeling of his or her particular work unit. This began in the very earliest stages of planning with the blueprints. These were placed in an easily accessible location for all employees to study them, and we encouraged workers to ask questions. If we couldn't answer them, the construction engineer did. The architectural and structural engineers had set certain area limitations for each unit within which we had to work. However, we could and did seek suggestions as to the type and placement of equipment needed, and we incorporated in the final plans those suggestions which were practical. If a suggestion was impractical, we talked it over fully with the employee who had made it, explaining the reasons for refusal. Also, we discussed with the employee concerned such problems as placement of supporting columns where they might affect work areas.

As work progressed, we decided to inform workers each day about the plans for construction for the next day. For instance, if work had reached a stage where the electricians had to work in one area and the carpenters could not, we discussed the new area to be prepared for the carpenters. Such discussions were informal, but held within hearing range of as many employees as possible. We invited any employee or group of employees directly concerned to participate and welcomed their ideas.

In this way, employees did not have to seek out the dietitians with their problems and worries, but rather were sought themselves. The dishwashers, servers, and waitresses in the serving room were asked about the problems they felt would face them when the walls around the serving room were to be torn down. The pastry cook knew when and where the first partition would cut across her work area and what the men on the other side were doing. This policy kept employee interest in the daily progress of the work high and saved much time. The curious employee already knew what was happening and had no excuse to leave her work to find out.

Through group discussions, also, we tried to prepare the employees for the two months of inconvenience.

INCONVENIENCES

As the walls were torn down, fine plaster dust would inevitably sift into the work areas. Arrangements were made with the foreman of the construction gang for "dustproof" partitions—sheets of plywood overlapped—which helped slightly, but the dust was too fine to be kept out completely. And, of course, there was considerable noise—hammers, saws, machines, tools, men talking, snatches of songs, and whistles—which was distracting.

Delivery of supplies to the various units was erratic and unreliable. Storage areas, crowded to capacity before the remodeling began, soon resembled the famed Fibber McGee closet. It was impossible to tell accurately where any of the hand equipment was, and unless employees were extremely careful, the unsalted and unsweetened canned foods were confused with the standard products.

Also, the work was executed during the summer when the warm, humid days added to the physical discomfort of the situation.

Inconvenience, of course, extended beyond the disorganization of stores and equipment, dust, noise, and heat. As the walls were torn down, work areas for a time became even more cramped. Because the main kitchen was the last area to be remodeled, in the earlier stages work normally done in other areas had to be moved into the main kitchen. This included preparation of therapeutic diets, salads, and private patients' diets. *Cramped* conditions became *crammed* conditions.

Inevitably, the cooks of the main kitchen resented the intrusion of the other employees in their already too-small quarters. Therefore, we tried to make conditions more bearable by carefully planning working hours and areas for each preparation period. With all our employees on an 8-hr. straight shift, the problems of planning the use of space were in some ways simplified, in others complicated. For instance, the pastry cook came at 5 A.M. and left at 1 P.M. After 1 o'clock, the space she occupied was turned over to the student nurses on therapeutic diet service for their evening meal preparation. However, during the overlapping of the two shifts, when *all* employees were working, work space was at a premium. We used the dining room tables as much as possible and simplified preparation.

We fostered cooperation among employees by informing them of the particular plans for the work areas. Even when an employee was going to be away from her assigned place, she was told who would use the space. Occasionally there were differences of opinion about ownership of such articles as measuring cups or canned goods, but this was understandable considering the difficult conditions.

SIMPLIFIED OPERATIONS

Another method we used to get employee cooperation was to include in the renovation some

plans that simplified our method of service. These plans actually were long-range plans intended for the future. For example, we planned, after the remodeling was completed, to have the employees in the main kitchen prepare all meat and vegetables. The pastry cook was to prepare all desserts, whether for modified, general, or private patients' diets. Therefore, when it became necessary to dismantle the kitchen where the food for private patients and modified diets was prepared, we shifted into the new system.

The cook who had been preparing the meals for private patients was assigned to her new job as head salad cook, and even though her salad unit was not yet completed, there was no loss of dignity in her change of position. She was made to feel fully as responsible as when she prepared the food for private patients. She had another person working under her and conferred as usual with the dietitian.

One other plan for simplifying work was to combine the three dining rooms into one large one. This helped the waitresses, who found that this simplified and expedited their work in cleaning the dining rooms. We also changed from using table cloths on a motley collection of old wooden tables to colorful, plastic-topped tables which not only reduced the waitresses' work but added color to the dining room.

Our policy of keeping the employees well informed on the purpose and time of each move was the most effective method of building good morale and high interest. We spread the information by all of the means described above, and in addition posted charts of progress at various times on the bulletin board of the dining room. These charts were made by one of our dishwashers who cleverly depicted the set-up of the department as it would be when completed. In another frame, he presented the current status of the work.

OTHERS COOPERATED

We believe that the excellent cooperation of other departments in the hospital did much to aid morale in ours. The administration helped us considerably with its understanding and constructive suggestions. The members of the housekeeping department worked hard to keep the corridors leading from the kitchen clean of plaster dust tracked out by people and food carts. The maintenance department, the laundry, and all the other interested groups showed great cooperation throughout the whole procedure. Even when the personnel of the hospital were asked to travel many extra steps to reach the dining room, they rarely complained. Rather they enjoyed walking through the construction areas and becoming "sidewalk superintendents" for a few minutes.

The nurses and ward helpers were particularly helpful in explaining to patients from day to day what the noises were and why meals were sometimes late. The nurses also escorted patients to see the work in progress, a practice we encouraged when it could do no harm, because we felt that the more interest created, the better would be our relations with the community. The personnel of the Dietary Department, too, were rather proud of the renovation as they could see the work progress and could visualize the final result. They were happy to show the new equipment and work units to patients, nurses, and any other visitors who came into the department.

The day the remodeling was completed, we held open house; this was a proud and happy occasion for everyone in the Dietary Department. The understanding and morale built up through the two months of construction continued to grow and became a part of the renovation—intangible, but clearly recognizable with attitudes of cooperation and interest replacing those of rebellion and temper.

Motion and Time Study in Clearing Dishes and Handling Trays

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At the Ætna Life Insurance Company, the food service includes two cafeterias with two lines each, where about 2300 employees are served within a period of 1½ hr. at noon. From its opening in 1930 until last year, soiled dishes have been bussed from the tables by food service department employees. Trucks were wheeled about the dining room and dishes were scraped, sorted, and stacked to be taken to the dishwashing room. Customers placed their own empty trays on stands located about the room, from which food service employees lifted them to trucks and brought them to stations near the serving lines where they were cleaned in preparation for re-use. Each pile of trays was lifted three times. The procedure was noisy, dish breakage was heavy, and it was extremely difficult to obtain the twenty-eight employees needed to do the work. Office employees could not be spared from their regular duties, and the hours were too short to interest outside applicants for work. Also, if delays in clearing the tables occurred, customers who arrived in the cafeteria at 10-min. intervals often could not find clean tables.

It was decided to inaugurate some type of self-clearing system to alleviate this bad situation. To learn how other organizations had solved the problem, several food service operations were visited. A

[1] The authors wish to express their appreciation to the Planning Department for the help offered in working out the procedures described.

common method, we found, was to have customers bring soiled trays and dishes to an opening in the wall leading to the dishwashing room. Sometimes this worked smoothly, but at other times, the situation seemed confused, because dishes arrived in rapid succession, required fast handling, and sometimes were broken. Moreover, at Ætna, because of construction and layout problems, it was impossible to construct such openings. Hence another method had to be devised. Since the idea represented a complete change of routine for several thousand customers, much advance planning was necessary to make the new system operate smoothly.

On each side of each cafeteria, an open rack on which customers could place their trays was built near the exit. Even this took experimentation, for the first racks were much too large and had to be reduced in size three times before the final permanent racks were constructed.

Customers were asked to eat on their trays and bring them to these racks when finished. They place silver in boxes and paper waste in special receptacles nearby. Two employees are stationed at each rack

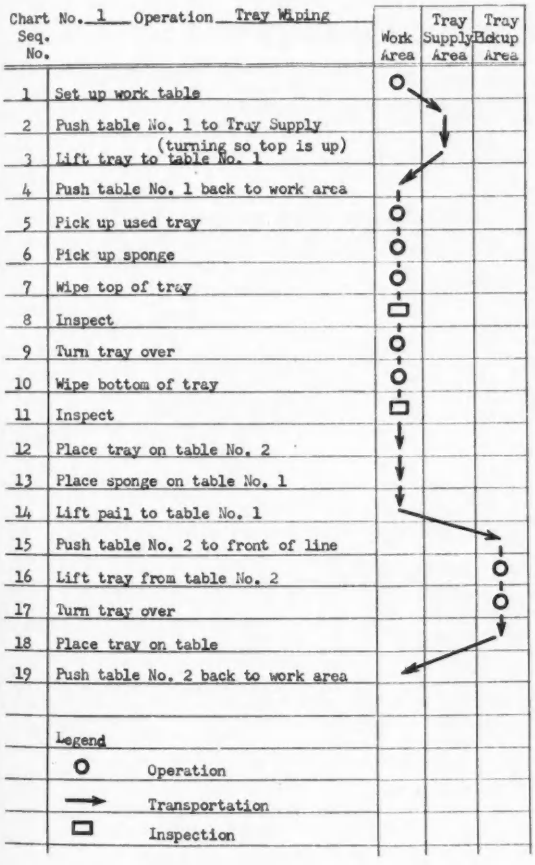


Chart No. 1 Operation Tray Wiping
Seq. No.
Work Area
Tray Supply Area
Tray Pickup Area
1 Set up work table
2 Push table No. 1 to Tray Supply
3 Lift tray to table No. 1 (turning so top is up)
4 Push table No. 1 back to work area
5 Pick up used tray
6 Pick up sponge
7 Wipe top of tray
8 Inspect
9 Turn tray over
10 Wipe bottom of tray
11 Inspect
12 Place tray on table No. 2
13 Place sponge on table No. 1
14 Lift pail to table No. 1
15 Push table No. 2 to front of line
16 Lift tray from table No. 2
17 Turn tray over
18 Place tray on table
19 Push table No. 2 back to work area
Legend
Operation
Transportation
Inspection

FIG. 1. *Sequence of procedure in tray wiping as first revised.*

to stack the dishes on adjacent trucks and to place the trays on tables specially designed to hold our size of tray. A third employee cleans the trays. At the suggestion of one of the cafeteria employees working in the unit, castors were put on these tray tables so that they could be wheeled to the serving line after being cleaned. In each cafeteria one person rolls full trucks of dishes to the dishwashing room. With this system, the number of employees required for the bussing operations has been reduced from twenty-eight to fourteen.

The new plan was announced in the company publication on the day it was to be inaugurated, and we were pleased at its ready acceptance by our employee-patrons, many of whom had followed similar procedures when eating in school lunchrooms prior to entering the business world. Several indicated pleasure at always finding a clean table and at the reduction in noise in the dining room.

The new procedure is detailed in Figure 1, which presents the sequence of operations followed in handling the soiled trays. Figure 2 shows the physical layout of the work area.

After the new system had been in operation for a short time, it was felt that further improvement in the procedure might increase the employees' efficiency, reduce rehandling and lifting of trays, improve the sanitation, and speed the rate of availability of trays during the service period. Contact was made with the Planning Department, and a methods analyst was assigned to the problem. He studied and charted the operation and recommended changes, all of which were accepted and adopted. In each unit, his procedures were put into effect after careful training of the employees who were to do the work.

A summary of his recommendations follows. It should be noted that on two days a week a movie program is presented at noon in the auditorium located between the two cafeterias. On these days, many more customers use the two racks nearest the auditorium than the others. This means that more trays are brought to those two sides than are taken from them.

He recommended first that all tray wiping operations be conducted right at the dish collecting station. He pointed out that by wheeling an empty portable table to the tray supply area and rolling the loaded portable table of dirty trays back, the

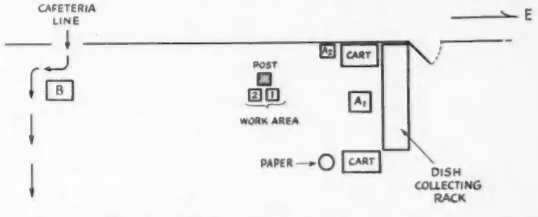


FIG. 2. *Sketch of dish collecting area on east side of East Cafeteria.*

Chart No. 1 Operation Tray Wiping

Seq. No.		Work Area	Tray Supply Area	Tray Pickup Area
1	Set up Work Area			
2	Push Table 1 to supply area			
3	Push Table 2 back to work area			
4	Pick up sponge			
5	Wipe bottom of tray			
6	Inspect			
7	Flip tray over to Table 3 (turning right side up)			
8	Wipe top side of tray			
9	Inspect			
10	Return sponge to bucket			
11	Push Table 3 to pick-up area			
12	Push Table 4 back to work area			
13	Push Table 1 to supply area			

FIG. 3. *Final procedure for tray wiping as worked out by Planning Department.*

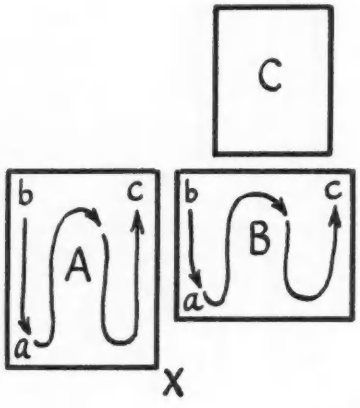
transferring of trays from the deposit site to the table (Step 3, Fig. 1) could be eliminated. Also, by placing a small stationary table in the work area and keeping the water pail on it, Step 14 could be omitted. In addition, he suggested placing the tray tables at the beginning of the cafeteria lines on wheels. Then, Steps 16, 17, and 18 could be done away with by wheeling the tables of clean trays to the pick-up station and exchanging tables, taking the empty table back to the clean-up area.

The revised procedure, which reduced from nineteen to thirteen the steps in this operation, is shown in Figure 3. The box further illustrates the motion pattern followed in the actual wiping of the trays.

Thought was also given to placing the work area at the same location as the tray supply area, which would make Steps 2, 3, and 4 unnecessary. However, this was found unworkable in two locations due to limited space, but it was adopted at the other two where sufficient space was available.

The methods used in dish collecting were also

Motion Pattern of Wiping Procedure



WORK AREA SET-UP

◂ **Arrows indicate the wiping path of the right hand**

Empty movable Table A.

Movable Table B with soiled trays upside-down. Table B stands at right angles to Table A.

Stationary Table C with bucket of clear water (sponge immersed in water).

Operator stands at position X.

MOTION PATTERN

Left Hand	Right Hand
1. ————.	1. Pick up sponge.
2. Wring out sponge.	2. Wring out sponge.
3. Steady tray at point *a*.	3. Wipe tray in pattern from point *b* to *c*.
4. Pick up tray at *a* and turn over to position on Table A.	4. Pick up tray at *c* and turn over to position on Table A.
(Tray is flipped over, left hand moving from position *a* on Table B to position *a* on Table A, while right hand moves from position *c* on Table B to position *c* on Table A.)	
5. Steady tray at point *a*.	5. Wipe top side of tray in pattern from *b* to *c*.

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Phosphorus	.33 gm.	.46 gm.
Vitamin A	940 I.U.	2380 I.U.
Thiamine	.14 mg.	.77 mg.
Riboflavin	.56 mg.	1.64 mg.
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Cholesterol	299 mg.	38.4 mg.
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*Nutritive value of Eggnog from Bowes and Church, 7th Ed. 1951.

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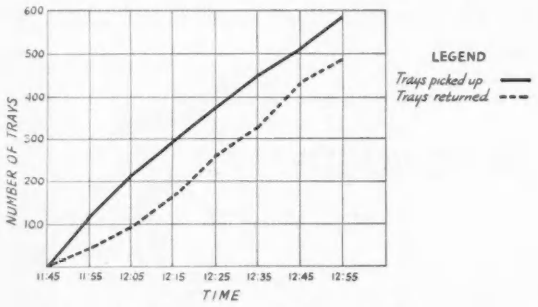


FIG. 4. *Relationship between trays used and trays returned on west side of East Cafeteria.*

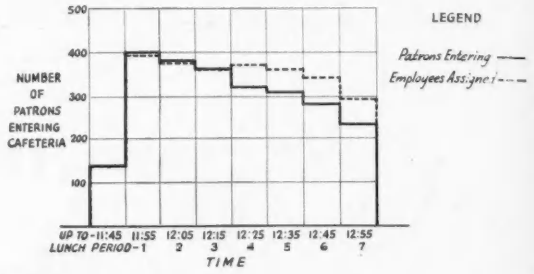


FIG. 5. *Relationship between patrons entering cafeteria and number of employees assigned to each period during January and February.*

scrutinized, and some adjustments made at the suggestion of the method analyst. He recommended that receptacles be placed so that departing patrons deposit their paper waste before placing their trays on the dish collecting rack. This is a convenience for patrons. Such receptacles, he warned, should not be placed in front of exits, both because it would be a hazard and would also impede the flow of traffic.

Dish collecting racks on the east side of the East Cafeteria and on the west side of the West Cafeteria were arranged so that the doors do not open toward the rack, allowing for more usable rack space, as well as a faster flow of departing patrons.

To insure proper placing of trays in the racks by patrons, he suggested that ½-in. square wooden strips be nailed to the rack shelves to divide each shelf in half. This prevents some trays being placed sideways on the rack, thus causing an interruption in the handling operations of the dish clerk.

Observation of the over-all system indicated a very uneven flow of work; instead, there are light and heavy periods of dish and tray collecting. It was also noted that the tray supply was depleted from time to time, thus forcing patrons to wait for a tray. An uneven flow of employee-customers into the cafeteria was also noted.

Because of these general observations, charts were prepared showing the relationship between the number of trays used and the number returned per unit of time (*Fig.* 4). The number of patrons entering the cafeteria per time unit was also charted (*Fig.* 5). Analysis of these charts showed that:

(a) The rate of tray return was far less than the rate of pick-up during the first 30 min. of the lunch period. In the case of the west side of the West Cafeteria, the rate of return did not equal the rate of pick-up until the very end of the lunch hour.

(b) There was an uneven distribution of the number of employees entering the cafeteria at a given time. About 32 per cent of those eating in the cafeteria entered during the first two regular periods.

(c) To insure an even flow of patrons, there should be about 330 assigned to each regular period.

(d) Activity of the dish collecting station in the west side of the West Cafeteria was comparatively light. It was recommended that the slower workers be assigned to this station.

(e) After 12:30, the returned trays pile up rapidly in the west side of the East Cafeteria. This supply could be used to supplement the supply in the west side of the West Cafeteria which is usually low at this time.

(f) An increase in work of about 15 per cent can be expected at the stations at either side of the auditorium on movie days.

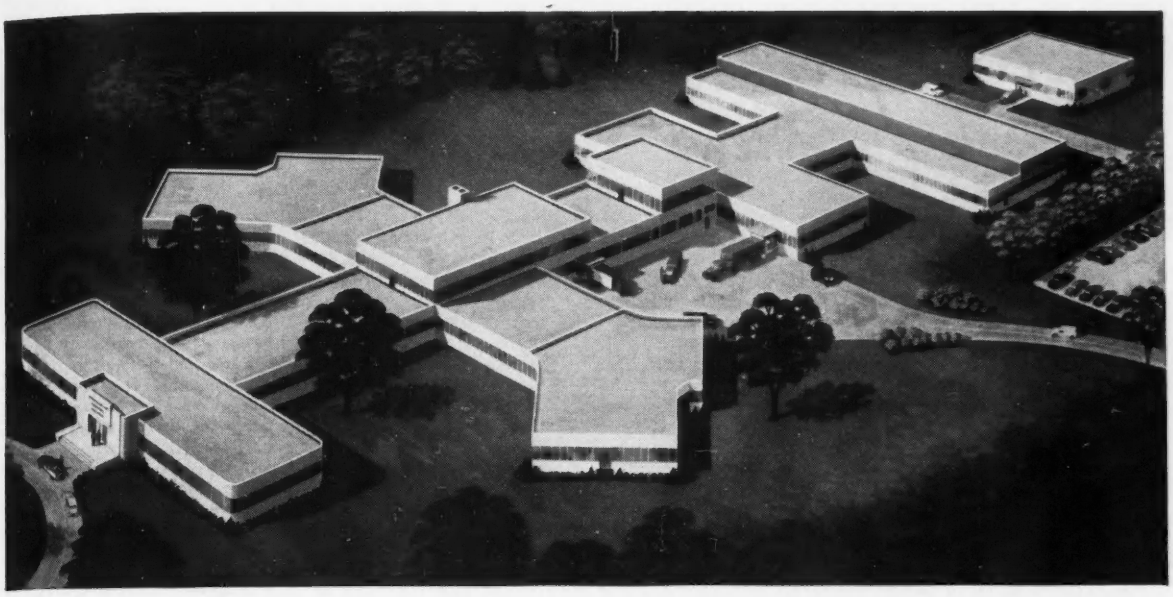
With these facts at hand, the need for trays at the beginning of each lunch hour was calculated as follows:

West Cafeteria	
West side	360 trays
East side	290 trays
East Cafeteria	
West side	340 trays
East side	340 trays
	1330 trays

The problem of customer load was discussed with the Personnel Department and an effort is now being made to correct this situation by adjusting lunch hour periods.

Benefits of methods of analysis such as this are many. With procedures detailed so concisely, training of employees becomes a simple matter. In addition, from the budgetary viewpoint, the number of employees required for "bussing" has been cut in half, and dish breakage has been substantially reduced. Perhaps most important of all, our employee-customers now find clean tables waiting for them when they have gone through the cafeteria line and their meal period is quieter.

In 1954, according to the Bureau of Labor Statistics, 7 min. working time was required to purchase 1 qt. fluid whole milk in a grocery store. This compares with 11 min. in 1939.



American Can Company opens world's largest container research center

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American Can Company, leader in food and container research for nearly 50 years, has opened a multimillion-dollar Research and Development Center at Barrington, Illinois. Located on a 40-acre wooded tract some 40 miles northwest of Chicago, the new laboratory is equipped to give even greater emphasis to Canco's extensive scientific program for advancement in canning and packaging technology.

Since 1906 when it established the country's first container research center, Canco has continuously expanded its research efforts. Through the Canco laboratories have come such important developments as the vacuum pack coffee can, the reclosable shortening can, fibre and metal cans for dry food products, beer and carbonated beverage cans, and the single-trip paper milk container.

Canco research also has pioneered in the development of processing and packaging techniques. Safe processes for canned foods were established on a scientific basis many years ago. Similar laboratory studies have proved that canned foods are excellent sources of the nutrients essential to a balanced diet.

In their new laboratory, Canco scientists will continue to study new methods which may further improve the flavor, color, texture and nutritive values of packaged foods.

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Book Reviews

Diet Book. By Better Homes and Gardens. Des Moines, Iowa: Meredith Publishing Company, 1955. Cloth. Pp. 255. Price $2.50.

Commendations are due Donald G. Cooley, a well known science writer, and the foods and book editors of *Better Homes and Gardens* for an easy-to-read, sound book on diet. No small part of the attractiveness is due to clever cartoons, artistic format, use of color, and good quality paper. The "light touch" contributes to the easy reading, but the "fortissimo" comes in the clarity given to complex principles and theories.

The major and best portion of the book concerns reducing. One chapter is devoted to meal plans at 1000-, 1250-, and 1500-calorie levels. Winter, spring, summer, and fall are illustrated with four-day menus. While these menus are attractive and nutritionally well planned, four days are not enough to effect significant weight losses. For making further menus, only brief and general guidance is given in the text. It would seem that the authors expect readers to make substitutions adequate both qualitatively and quantitatively. While it is possible that *qualitative* substitutions can be made with this limited guidance, it is assuming a great deal to believe that *quantitative* adequacy will also result. This will be particularly true if much variation arises from regional, national, economic, and occupational differences in food habits. The use of pattern diets with a more complete list of appropriate substitutions might have obviated some of these hazards. Pretesting of the use readers make of the diets might have been in order.

The latter part of the book concerns such modified diets as the bland, low-cholesterol low-fat, and restricted sodium. A good discussion accompanies each, but the foods include only lists of "do's and don'ts." No attempt is made to make quantitative recommendations for a day's food intake as was done with the plans for reducing. In this case, it is recommended that the physician take the responsibility. However, it might have been of greater help to the physician had an outline of a basic plan providing minimum essentials for one day been included. It could then have been suggested that the patient review with the physician the basic plan for individual adaptation.

Frequent admonitions are offered throughout the book to seek the physician's advice in the use of the diets. Certainly, with help from the physician and nutritionist, this book will serve as an excellent supplement for lay use.

New Guide to Intelligent Reducing. By Gayelord Hauser. New York: Farrar, Straus and Young, 1955. Cloth. Pp. 309. Price $3.

Hauser students and fans will be delighted to know that their favorite authority in nutrition has again hit the jackpot by presenting them with the solution to one of the nation's primary public health problems—obesity. Followers of the Hauser movement, including the novitiates, will undoubtedly proclaim Gayelord Hauser's latest book, *New Guide to Intelligent Reducing*, as the long-awaited panacea. We predict that the Hauser sect will be considerably enlarged by the timely appearance of this book which explores the prevalent, personal problem of excess poundage. For those who, up to now, have remained outside the Hauser circle, either through choice, disinterest, or ignorance, the book will furnish interesting and stimulating reading. For the professional dietitian and nutritionist, it will undoubtedly furnish controversial material and will probably be accepted and rejected in parts—depending somewhat on the already existing attitude of the reader.

In his newest and tenth book, Mr. Hauser has delved into the realm of psychology and psychiatry to examine the causes of overweight and to support his advice on how to retrain and re-educate the appetite (or resetting the "habitstat"). He believes a person can be freed of a slavish appetite or immature, demanding emotional habits by the application of three psychologic "freedoms": freedom from bodily, mental, and spiritual fat; freedom of food; and the adult prerogative of freedom of choice. To obtain this happy state of freedom is to reset the "happystat." Our optimism is not as great as that of Mr. Hauser, who claims that six weeks is sufficient time in which to retrain the appetite and habits of eating. He cleverly manages to create self-confidence in the victim's ability to be free of fat and also to eat as he wants, and, at the same time, manages to increase the reader's confidence in Hauser.

Mr. Hauser hits on the conflict often found in the obese—the overanxious desire to shed unwanted pounds but the unwillingness to experience denial by giving up established habits of eating. His analysis of this major hurdle for the overweighter is exceptionally good. Whether such an explanation helps to resolve the problem finally and permanently is questionable.

As in his other books, Mr. Hauser has succeeded in dramatizing and glamorizing the subject of food and nutrition. His style, like his descriptions of food, is fresh and flavorful. The theme is familiar.

The author by his own admission has adopted a new approach to the weighty problem. In place of a do-and-diet regimen, he has substituted a reducing plan (and a life plan) for intelligent eating. He encourages a new understanding of foods in terms of "lean" and "rich" rather than fattening and non-fattening and, on this basis, proposes a "yes-and-no" system to guide the reducer in his selection of food. The over-all pattern of eating three meals plus three snacks, which he recommends, should find ready acceptance. The new plan calls for a relaxed, self-permissive—take it and/or leave it attitude on the part of the dieter. The wonder foods —brewer's yeast, powdered skim milk, wheat germ, yogurt, and blackstrap molasses—are still enthusiastically sponsored by Mr. Hauser with two new additions—licorice in the form of "licorice fizz" and Jerusalem artichoke.

The role of exercise has not been overlooked. The author describes and advocates a turtle-neck exercise for extra chins and the stomach lift or systematic deep breathing to aid in weight reduction.

Of special interest to those most concerned should be the section containing menus, Mr. Hauser's favorite recipes, weight charts, and a key to the "yes-and-no" foods. In addition, menus for a week—all tabulated—are included for those who like regimented eating. Good suggestions are given for meat and vegetable cookery and the preparation of salads and fruit desserts.

The New Guide to Intelligent Reducing is presented by Mr. Hauser to those who have faith in their inherent ability to "grow" and in so doing achieve a realistic goal—or, in his words, to those who are "*willing* to be happy."—*Grace K. Finnegan, Nutrition Consultant, California Department of Public Health, San Francisco.*

NEW BOOK RECEIVED

Food Service in Institutions. Third Edition. By Bessie Brooks West and LeVelle Wood. New York: John Wiley & Sons, Inc., 1955. Cloth. Pp. 682. Price 7.50.

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Current Literature

Contributed by Mildred Bonnell and administrative dietetic interns, University of Washington, Seattle; Janette C. Carlsen and Ethel M. Miller, The Johns Hopkins Hospital, Baltimore; Marjorie Cheney, Dietetic Intern, VA Center, Los Angeles; and the Journal staff

AMERICAN JOURNAL OF MEDICINE

Vol. 18, March, 1955

* Studies on myocarcardial metabolism. 4. Myocardial metabolism in diabetes. I. Ungar, M. Gilbert, A. Siegel, J. M. Blain, and R. J. Bing.—p. 385.
* Arteriosclerotic heart disease in diabetes mellitus. A clinical study of 383 patients. I. M. Liebow, H. K. Hellerstein, and M. Miller.—p. 438.
* Causes of labile diabetes: its treatment. J. I. Goodman.—p. 448.

Myocardial Metabolism in Diabetes. Changes occurring in the heart metabolism of human patients with diabetes mellitus and in dogs with alloxan diabetes have been investigated. Results indicate that the diabetic heart is deficient in the metabolism of carbohydrates, proteins, and fats.

Arteriosclerotic Heart Disease in Diabetes. A cardiac survey was made of 383 outpatients with diabetes. Forty-two per cent had arteriosclerotic heart disease. An additional 16.2 per cent had arteriosclerosis of the aorta; angina pectoris was found in 10.2 per cent; and 6.8 per cent had myocardial infarction. The prevalence of arteriosclerotic heart disease was related in positive manner to sex, age, and the presence of hypertension. The prevalence of arteriosclerotic heart disease was not related to the total serum cholesterol level, the degree of control of the diabetes, the patient's weight, the daily insulin dose, or the duration of the diabetes.

Labile Diabetes. A series of twenty-five patients with diabetes, ranging in age from six to forty years, were reviewed for evidence of lability. During a total observation period of 68.7 years there was one mild episode of acidosis in this group, and no severe insulin reactions occurred. Previously, eight of these patients had suffered one or more bouts of keto-acidosis, and nine had had significant insulin reactions. Ideal control (less than 10 gm. glucose excreted in 24 hr.) was ultimately obtained in nineteen of the twenty-five patients. The average time required to achieve this was ninety-two weeks per patient.

THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES

Vol. 229, March, 1955

* The problem of the action of insulin. W. C. Stadie.—p. 233.

Insulin Action. Since the experiments of von Mehring and Minkowski in 1890, a great deal of scientific research has been done on the problem of insulin action in diabetes mellitus. This has brought about a complete change in the views of the diabetic defect. The two theories of "underutilization" and "overproduction" held supremacy for a time. Now there are three contending theories: one indicates barriers across cytologic boundaries which interfere with glucose transfer; the second implies defects in glucose phosphorylation; while the third involves diminished oxidative phosphorylation. These theories, however, are not the complete answer. The entire interplay of other hormones besides insulin must still be integrated into a complete theory of insulin action.

AMERICAN JOURNAL OF PUBLIC HEALTH

Vol. 45, March, 1955

* Nutritional needs of institutionalized patients. J. M. Hundley.—p. 328.

Vol. 45, April, 1955

* A bookshelf on foods and nutrition. R. E. Shank and E. M. Mrak.—p. 419.
* Diet and nutritional status of Iowa school children. E. S. Eppright and C. Roderuck.—p. 464.

Nutritional Standards for Institutions. The Public Health Service has formulated nutritional standards for its hospitals, which fall into three types (as far as nutritional requirements of patients are concerned): general and neurosychiatric, tuberculosis and leprosy, and research. Nutritional standards insure the nutritional adequacy of food services, as well as promote a practical system of food control, management, and budgeting. The standards worked out for these hospitals were based on the Recommended Dietary Allowances, with amounts adjusted to cover the needs of illness. After standards had been developed, dietitians in several hospitals were asked to use them to determine practicability. Results have now been analyzed by the Public Health Service. In general, the standards for the general and neuropsychiatric hospitals and for tuberculosis and leprosy hospitals have proved satisfactory. Those set up for the research hospital (Clinical Center) are still being tested.

Bookshelf on Foods and Nutrition. The authors have attempted to select from a large number of books and articles on foods and nutrition those of particular importance for professional workers in the health sciences.

Nutritional Status of Iowa Children. A survey has shown that the core of the diets of Iowa children consists of liberal amounts of meat, potatoes, sweet desserts, table fat, and bread and other cereals. The mean daily consumption of milk was between two and three cups, depending on the age-sex group. Consequently, the mean daily intake of calcium was somewhat low. Many children used little of the ascorbic acid- and carotene-rich fruits and vegetables; hence many had diets somewhat low in these nutrients. Physical measurements and hemoglobin concentrations of the blood indicated a fairly satisfactory state of nutrition. Perceptible differences in physical development were evident between the groups of children at the two extremes of nutrient intake. The studies yielded some examples of fundamental relationships between diet, nutrient consumption, and nutritional status on a group basis. The teen-age girls constitute an exceptional group whose nutrition and physical development seemed anomalous. With these children, the principal health problems with nutritional implications are dental caries for all children and weight control, particularly for teen-age girls.

FOOD TECHNOLOGY

Vol. 9, March, 1955

* Bacterial spoilage of eggs. I. Bacteriology. P. C. Trussell.—p. 126.
* Taste comparisons: two samples or three? N. T. Gridgeman.—p. 148.

Vol. 9, April, 1955

* Frozen grapefruit, tangerine, and limeade concentrates. M. K. Veldhuis, W. C. Scott, and F. P. Griffiths.—p. 198.

Bacterial Spoilage of Shell Eggs. In order of importance, the causes of infection of eggs on farms were: poor washing methods, heavy visible soiling of eggs, and infection of eggs by nesting material. Gram-negative bacteria were found to be the cause of spoilage. Spoiled eggs contained both non-fluorescent and fluorescent types of bacteria, the former predominating. It has been possible to infect fresh eggs with both types of bacteria isolated from spoiled eggs. Commercial candling with ultra-violet lamps is only partially effective in detecting infected eggs. In a survey of nine farms, bacterially spoiled eggs were obtained from five farms, and the potential spoilage was 4.9 per cent of all eggs.

Two Samples or Three in Taste Testing? Three common experimental designs for the detection of small differences in the intensity or quality of two flavors are: pair tests (which is the stronger? or which is the regular flavor?); duo-trio tests (which of the two coded aliquots is identical with the third "standard" aliquot?); and triangle tests (which of the three aliquots is odd?). A balanced experiment to test the relative power of the designs is described. Six subjects made eighteen replicate parallel trials of the three

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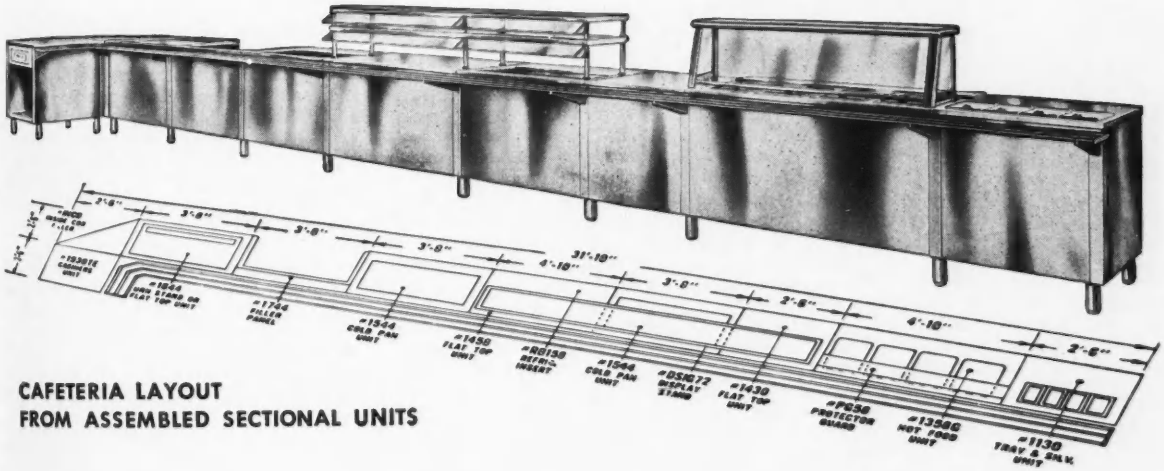

CAFETERIA LAYOUT FROM ASSEMBLED SECTIONAL UNITS

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methods on two slightly different samples of each of three materials: mixed primary flavors in water, tomato juice, and ground beef. The results suggest that pair tests and triangle tests are normally about equally powerful and appreciably superior to duo-trio tests.

Frozen Citrus Concentrates. The principal properties and problems of frozen grapefruit, tangerine, and limeade concentrates are discussed. The grapefruit product shows a greater tendency to gel and clarify in storage than does orange concentrate. Heat treatment, such as heating to 180°F. for a few seconds, is commonly used to provide stability against deterioration. Since tangerines are quite fragile and irregular in shape, they must be handled with care to prevent damage in processing. Tangerine concentrate has less tendency to gel and clarify than orange and grapefruit concentrates. Lime juice must be diluted and sweetened because of its high acid content. A frozen concentrate made from single-strength Persian and Mexican limes is already on the market, and more products can be prepared from Persian limes by adding lime purée to concentrated lime juice. A sweetened limeade superconcentrate can be prepared, one volume of which requires dilution with seven volumes of water, or an unsweetened limeade superconcentrate which must be sweetened and diluted to thirty-five times its volume for serving.

GASTROENTEROLOGY

Vol. 28, March, 1955

* Experimental observations on the etiology of gastric carcinoma. 2. The effect of heat, browned overheated fats, food dyes and carcinogenic hydrocarbons on the gastric mucosa. A. C. Ivy.—p. 345.
* The problem of nutrition following total gastrectomy. A. H. Johnson, H. J. McCorkle, and H. A. Harper.—p. 360.
* Controlled tubeless test meals. G. Behr and H. Lawrie.—p. 409.

Foods as Cause of Gastric Cancer? It has been reported that environmental factors are undoubtedly concerned in the etiology of gastric carcinoma. The present study indicates that a specific, water-soluble carcinogen may be involved. Overheated fat, certain certified food dyes, hot foods, and drinks should be suspected as dietary carcinogens. As of now, however, gastric carcinoma has not been produced experimentally by dietary means. Experimental and clinical evidence also supports the theory that the prevention and early adequate treatment of gastric ulcer and the prevention of gastritis should greatly decrease the incidence of gastric carcinoma.

Diet after Gastrectomy. Clinical and laboratory studies were done at the University of California, San Francisco, on thirty-six patients undergoing total gastrectomy and on 116 totally gastrectomized dogs. Alimentation time was decreased after complete gastrectomy; also, the amount of carbohydrate, fat, and protein absorbed is considerably less than normal. A tendency to regain weight and maintain better nutrition was noted when continuity was maintained between the esophagus and duodenum.

Test Meal for Achlorhydria. The tubeless test meal has become an accepted method of diagnosing achlorhydria. Studies done in England indicate that it is a completely reliable procedure, provided the patient is carefully prepared. The only disadvantage is the possibility of an unsuspectedly false negative result; this, however, has been eliminated by the addition of a positive control. No correlation was found between the blood urea level and the ability to excrete quinine.

JOURNAL OF AGRICULTURAL AND FOOD CHEMISTRY

Vol. 3, February, 1955

* Meat color, relation of free sulfhydryl groups to cured meat color. B. M. Watts, A. M. Erdman, and J. Wentworth.—p. 147.
* Biochemistry of myoglobin, changes associated with irradiating meat and meat extracts with gamma rays. I. D. Ginger, U. J. Lewis, and B. S. Schweigert.—p. 156.

Vol. 3, April, 1955.

* Milk proteins, nutritive value of whey powder protein. L. K. Riggs, A. Beaty, and B. Mallon. —p. 333.

Cured Meat Color. The fading of pigment in cured meat is presumed to be due to dissociation of the nitric oxide hemochromogen followed by oxidation of the heme iron to give the brown ferric hemochromogen. The dissociation and subsequent oxidation are greatly accelerated by light. Sulfhydryl groups protect the color, if sufficient nitrite is present. Dipping meats which give a positive nitroprusside test in strong nitrite for a few seconds prevents fading in fresh samples and restores pink color to surfaces that have already been faded by light. Whereas added nitrite protects the cured meat pigment from oxidation in the presence of protein sulfhydryl groups, it accelerates oxidation in their absence. This is true in meats such as bologna, which give a negative nitroprusside test, as well as those in which free sulfhydryl group have been removed by exposure to high concentrations of nitrite.

Changes During Irradiation of Meat and Meat Extracts. The susceptibility of myoglobin extracts to radiation damage increased with increased purity of the extract. Irradiation of myoglobin in crude extracts of meat gave inconsistent results, including oxidation and reduction reactions and the formation of a green compound which absorbs light at 610 to 620 mμ. It was shown that the porphyrin of this green compound was altered by irradiation. Myoglobin in meat packaged and stored in oxygen-impermeable material showed little change immediately after irradiation or storage. Packaging in oxygen-permeable material resulted in discoloration immediately after irradiation and further discoloration on storage. The addition of 0.05 and 0.5 per cent ascorbic acid was ineffective as a protective agent during irradiation.

Nutritive Value of Whey Powder Protein. The nutritive value of the crude protein present in a series of whey powders was lower than the nutritive value of lactalbumin. All spray-dried samples of whey powders fed in these experiments contained protein of higher nutritive value than roller-dried samples. The crude protein in spray-dried whey powder was more digestible and had a higher biologic value than that in roller-dried whey powder. The nutritive value of the protein of both spray- and roller-dried wheys was improved by supplemention with lactalbumin. Lysine supplementation only partially corrected the deficiency in roller-dried whey protein. Protein concentrates prepared by heat coagulation or methanol extraction of spray-dried whey were equal to lactalbumin in nutritive value. Both types of concentrates prepared from roller-dried whey were inferior to lactalbumin in nutritive value.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

Vol. 157, March 19, 1955

* Nutrition and disease. Editorials and Comments. —p. 1024.
* Excessive coffee drinking. Queries and Minor Notes.—p. 1069.

Vol. 157, March 26, 1955

Obesity. Editorials and Comments.—p. 1126.

Vol. 157, April 16, 1955

* Government-inspected meat. Queries and Minor Notes.—p. 1455.
* Vitamine U. Queries and Minor Notes.—p. 1458.

Nutrition and Disease. This editorial discusses the March, 1955 special issue of *Postgraduate Medicine*, a comprehensive report of current knowledge of nutrition in health and disease. A large series of cases illustrative of various phases of dietary deficiency have been compiled. There are still many gaps in our knowledge of what constitutes optimal nutrition. Since there is no specific laboratory test for any of the deficiency syndromes, the diagnosis depends primarily on a careful history-taking and physical examination. Symptoms of some deficiencies are discussed. Studies of human nutrition will continue to bring to the clinician fundamental knowledge about the prevention and treatment of disease. Greater efforts will be made to find ways of detecting subclinical nutritional deficiencies so that corrective steps may be taken before disability occurs.

Excessive Coffee Drinking. Two answers are given to a query on whether drinking twenty to thirty cups of coffee daily causes harmful effects. The symptoms caused by the amount of caffeine in twenty to thirty cups of coffee (2 to 3 gm.) may cause symptoms which are ordinarily not serious in healthy persons and disappear if the use of coffee is stopped. In persons with organic disease, these effects may be harmful and the excessive use of coffee should be stopped. The second consultant answers that any person who is obliged to inquire whether he is being harmfully affected by drinking twenty to thirty cups of coffee daily is surely not experiencing evidences of deleterious action. He feels that there is no great

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harm in drinking this amount of coffee and cites various coffee components and their effects.

Government-Inspected Meat. In answer to a question about the inspection of meat for trichinosis, and whether it is safe to eat government-inspected bacon uncooked, it is stated that bacon is classed as a product that is customarily well cooked before it is eaten. For that reason processing by the packer for the destruction of trichinae is not required. Only meat and meat products which have the appearance of being cooked, such as hams and sausages, must be handled so as to destroy any possible live trichinae. Meats which might be eaten without cooking or which are meant to be so eaten are treated to make them safe. The best opinion is that one should not eat raw or underdone pork.

Vitamin U. Vitamin U is a term that has been applied to the anti-ulcer factor in cabbages and other green vegetables. It apparently promotes the healing of peptic ulcers and may prevent their recurrence. It has not been isolated, and the chemical formula is not known. It is not stable, being readily destroyed by heat and oxidizing processes. It may represent more than one factor.

JOURNAL OF BIOLOGICAL CHEMISTRY

Vol. 213, March, 1955

Studies on carbohydrate metabolism in rat liver slices. IV. Biochemical sequence of events after insulin administration. A. E. Renold, A. B. Hastings, F. B. Nesbett, and J. Ashmore.—p. 135.

* The fate of ingested acetyl-L- and D-tryptophan in the human subject. R. R. Langer and C. M. Volkmann.—p. 433.

Acetyltryptophan Metabolism. The two isomers of acetyltryptophan were administered separately to six adults, and the amounts excreted in the urine and feces were determined. No evidence was found for the metabolism of acetyl-D-tryptophan. Only 5 to 10 per cent of acetyl-L-tryptophan could be accounted for in the feces. An enzymatic absorption of acetyl-L-tryptophan has been suggested from this evidence.

JOURNAL OF CLINICAL INVESTIGATION

Vol. 34, March, 1955

* The anemia of liver disease: observations on its mechanism. J. H. Jandl.—p. 390.
* Acute metabolic alkalosis: its effect on potassium and acid excretion. M. A. Holliday, A. Lukenbill, and C. Hancock.—p. 428.
* Studies on alcohol diuresis. 1. The effect of ethyl alcohol ingestion on water, electrolyte and acid-base metabolism. M. E. Rubini, C. R. Kleeman, and E. Lamdin.—p. 439.
* Potassium and sodium restriction in the normal human. R. A. Womersley and J. H. Darragh.—p. 456.
* Interaction between oleate and the lipoproteins of human serum. R. S. Gordon, Jr.—p. 477.

Anemia of Liver Disease. Studies of twenty cirrhotic patients with anemia not caused by blood loss indicated that an extracorpuscular hemolytic process was present which was proportional in severity to the degree of anemia. The mechanism of this hemolysis appeared to have consisted in local destruction of red cells, probably through their sequestration in the spleen. Hemoglobin production, despite persistence of the anemia, did not generally exceed two or three times the normal rate, suggesting a diminished sensitivity to anoxia. This insufficient capacity to produce hemoglobin may have been impaired further by the ingestion of alcohol. Improvement in hemoglobin levels, at least initially, may be largely a result of increased production rather than of a decreased rate of destruction. In four patients, folic acid deficiency was the factor limiting hematopoiesis.

Alkalosis and Potassium and Acid Excretion. Male rats were prepared for three days on an electrolyte-free diet and then made chloride deficient and alkalotic by peritoneal dialysis. Four groups were studied utilizing various electrolyte intakes, and these were compared to a control group similarly treated but not made alkalotic. In contrast to the controls, all the animals made alkalotic excreted large amounts of potassium resulting in net deficits. This resulted in a lowering of cell potassium and a gain in cell sodium. Sodium ingestion increased the excretion of potassium and accentuated the muscle changes. Evidence was cited to indicate that the potassium excretion was effected by an ion exchange system as a direct and primary response to the induced alkalosis and that the excretion resulted in cell deficit. The alkalosis did not exert a consistent effect on ammonia or titratable acid excretion suggesting that the excretion of these ions was not directly affected by the induced alkalosis.

Effect of Alcohol on Water and Mineral Metabolism. The acute effects of alcohol ingestion (120 cc. whiskey) on water and electrolyte metabolism were studied in normal, semi-recumbent males during the morning hours. Alcohol caused a marked rise in urinary flow and free water clearance, as well as consistent falls in the excretion of sodium, chloride, and potassium. Although no definite cause for the fall in solute excretion was discerned, it is suggested that a redistribution of blood volume may have been the effective stimulus. The acidosis, the changes in electrolyte excretion, and the alterations in blood volume and renal hemodynamics could not be causally related to the diuresis after alcohol consumption.

Potassium and Sodium Restriction. In the normal human being, restriction of potassium intake leads to a deficiency of the ion, chiefly due to urinary losses, although the kidney is able to conserve potassium to some extent. Potassium conservation is promoted by restriction of sodium. Withdrawal of potassium is accompanied by a metabolic alkalosis and the production of a more alkaline urine. When sodium is present in the diet, potassium depletion results in the retention of salt and water in the extracellular space. These effects are prevented or abolished by sodium restriction.

Oleate and Serum Lipoproteins. Addition of sodium oleate to human plasma causes an increase in the mobility of alpha and beta lipoproteins, as well as the more familiar increase in the mobility of albumin. This effect is considered to be due to association of oleate ions with the lipoproteins, giving them a greater negative charge. In the case of beta lipoprotein, this association is shown to be reversible. This fatty acid-lipoprotein interaction is believed to be responsible for the electrophoretic changes observed after injection of heparin into lipemic animals or human beings, inasmuch as such injection gives rise to a clearing factor capable of effecting the hydrolysis of triglycerides with liberation of free fatty acids.

JOURNAL OF HOME ECONOMICS

Vol. 47, March, 1955

* New industry research in foods. A. Duncan, R. Staggs, Z. E. Anderson, C. A. Greenleaf, and F. Merriam.—p. 171.

Vol. 47, April, 1955

* Dry mix and frozen baked products: 3. Dry mix and frozen gingerbread. P. Paul, E. Sween, and B. Bittner.—p. 256.

Industry Research in Foods. The symposium briefly covers the latest research done in the fields of cereal, meat, milk, canned foods, and frozen foods. . . A study in a midwestern university shows that a good breakfast is necessary for people of all ages. The effect of protein on the blood sugar level is the same, whether the protein is of plant or animal origin. Studies are also being carried out to determine the implications of weight reducing diets, motivation for cereal buying, and the effects of various foods on rat growth. . . Research is being done on meat with regard to processing and preservation. An example of this is needle pumping of bacon which shortens the curing time and gives a more uniform product. New products are constantly being developed, such as skinless hams and fully cooked sausages. . . Laboratory work has shown that cow's milk is a good source of vitamin B_{12} and the essential vitamin B_6. Heat somewhat reduces the content of B_6. . .Research has helped the crop expert to predict and control the flow of raw food to the canning factory. Work is also being done on special dietetic canned foods.

Gingerbread. Freshly prepared, frozen-baked, frozen batter, home-prepared-mix, and commercial-mix gingerbreads were compared for palatability, volume, *p*H, preparation time, and cost, when fresh and after storage for one, two, and four months. Results showed that the mixes were almost equal in cost, but differed quite a bit in preparation time, the commercial mix taking the shortest time, and the frozen batters, because of thawing time, the longest. The freshly prepared, frozen batter, and home-prepared-mix gingerbreads were all scored "good" to "very good" throughout the four months'

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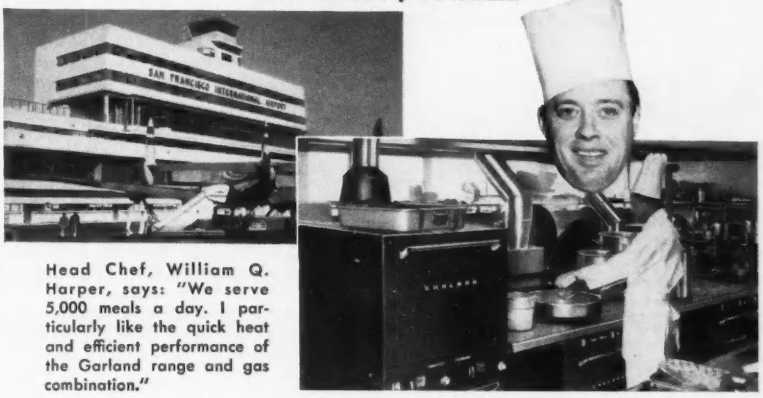

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testing period, but the frozen-baked and commercial-mix products in all tests deteriorated sharply after one to two months' storage and were considered unacceptable after four months' storage.

JOURNAL OF THE INDIAN MEDICAL ASSOCIATION

Vol. 24, December 16, 1954

* Consumers' trials with food yeast in Utter Pradesh. K. K. Govil.—p. 220.

Consumers' Trials with Food Yeast. In an effort to improve the poor diet of the Indian people, studies have been conducted to learn the reaction of consumers when food yeast was cooked with popular Indian dishes as well as to find out if a demand for it could be created in the villages. Yeast, a particularly valuable source of proteins of high biologic value to vegetarians, can be manufactured in large quantities in a short period at a comparatively low cost. Dried food yeast (*Tortula utilis*) was found acceptable and palatable human food if taken in small amounts, about 11 gm. per day. Half an ounce of dried food yeast could be consumed daily per adult person without affecting the taste or flavor of the common Indian dishes and without causing any digestive upset. In adults, the intake of dried food yeast increased the appetite and the subjects felt better. The people are reluctant to accept the food yeast, however, and wide publicity appears necessary to create a demand for it.

THE JOURNAL OF NUTRITION

Vol. 55, March 10, 1955

* Effect of long time feeding of whole milk diets to white rats. G. Sperling, F. Lovelace, L. L. Barnes, C. A. H. Smith, J. A. Saxton, Jr., and C. M. McCay.—p. 399.
* Nutritional status of the aging. III. Serum ascorbic acid and intake. A. F. Morgan, H. L. Gillum, and R. I. Williams.—p. 431.
* Nutritional status of the aging. IV. Serum cholesterol and diet. H. L. Gillum, A. F. Morgan, and D. W. Jerome.—p. 449.
* Effects of fasting on blood non-protein amino acids in humans. L. W. Charkey, A. K. Kano, and D. F. Hougham.—p. 469.
* Effect of energy intake on the biological value of protein fed to rats. R. M. Forbes and M. Yohe.—p. 499.
* Further experiments on the utilization of calcium from salts by college women. M. B. Patton.—p. 519.

Effect of Whole Milk Diets on Rats. Albino rats were divided into six groups of sixty each at the time of weaning, each group consisting of twenty males and forty females (half of whom were bred and half not). The diets for the first four groups consisted chiefly of whole fresh milk supplemented with traces of manganese, iron, iodine, copper, and cod-liver oil. The diets were: (a) milk; (b) milk containing 10 per cent dissolved sucrose; (c) milk with the animals having free access to dry sucrose; (d) milk and 10 per cent water solution of sucrose; (e) mixed stock diet supplementeed with 10 per cent of its weight of whole, cooked dried-egg; and (f) stock diet only. Rats fed milk containing sucrose were always overweight; males failed to attain a normal life span and females failed in reproduction. Rats fed milk diets had denser bones in old age. Those fed milk or milk containing dissolved sucrose had no decayed teeth at death while those drinking milk with free access to either a water solution of sucrose or dry sugar showed decayed teeth. No evidence was found of a shortening of the life span as the result of consumption of 10 per cent whole egg in the diet; life span of males seemed substantially increased. A taste for sucrose persisted until the end of life. Females consumed more calories and more fluids per unit of body weight than males. As age progressed, caloric consumption was relatively constant affording no evidence for a decline in basal metabolism with age.

Ascorbic Acid in the Aging. Serum ascorbic acid levels, seven-day records of ascorbic acid intake, and physical condition, particularly of teeth and gums, were obtained for 569 supposedly healthy men and women over fifty, all of whom were living in their own homes except 44 men living in a county home. Women at all ages had higher serum ascorbic acid levels than men; in both sexes a maximum was noted in the age group sixty to sixty-four years. Total daily intakes of the men were greater at all ages. A direct correlation was found between the serum levels and intakes of the whole group. Seventy to 75 per cent of all men and women having less than 0.5 or 0.7 mg. per 100 ml. serum ascorbic acid respectively were in the lowest intake group. The mean serum ascorbic acid levels progressed from low to high according to economic level. Ninety-one per cent of the men in the county home, 40 per cent of those on relief and old age pensions, 21 per cent of those with middle incomes, and none with high incomes had serum levels less than 0.5 mg. per 100 ml. There was a consistently greater proportion, 24 per cent of the edentulous and those with gingivitis in the group with serum ascorbic acid below 0.3 mg. per 100 ml. than of those with healthy mouths (9 per cent). A higher proportion of those with teeth and healthy gums was found in the groups with the higher serum levels. The ascorbic acid requirement of men over fifty appears to be significantly greater than that of women.

Serum Cholesterol in the Aging. The serum cholesterol levels of 530 supposedly normal persons, fifty to more than eighty years of age living in their own homes, were found to vary from 106 to 720 mg. per 100 ml. blood. Free cholesterol was 27 to 28 per cent of the total, and this proportion did not vary significantly in any group. Mean level for forty-three men over sixty living in the county home was 209 $\pm$ 12. Women had significantly higher levels than men between the ages of sixty and eighty, a sharp drop in the levels occurring in both sexes at seventy-five or eighty years. There was a downward trend in the levels of the men with each decade but a sustained high level was shown by the women sixty to seventy-five years of age after a sharp drop between fifty-four and fifty-nine years; this drop may be due to a postmenopausal spurt in steroid hormone production. A positive correlation was found between dietary cholesterol and serum cholesterol levels in both men and women and a similar correlation between fat intake and serum cholesterol levels. A slight positive correlation with protein intake was also found. A striking parallelism was noted between the serum ascorbic acid and serum cholesterol levels in women but not in men, suggesting a possible relationship between these blood constituents and steroid hormone manufacture and circulation. Extreme under- or overweight (20 per cent or more) in men but not in women was associated with low and high serum cholesterol levels respectively as well as with low and high intakes of fat and cholesterol. No relationship between blood pressure and serum cholesterol levels was found. It is stated that standards for hypercholesteremia must be different for men and women and that dietary fat and cholesterol are associated positively with the serum cholesterol levels.

Blood Non-Protein Amino Acids. Forty-eight-hr. fasting in adult humans produced increased blood levels of leucine and valine. Blood levels of lysine, threonine, methionine, arginine, and tryptophan were simultaneously reduced. This response was entirely different from that found in chicks up to six weeks of age. Examination of the literature revealed a correspondence, for the human species and for chicks, between amino acids exhibiting a blood level rise during fasting and those not metabolically available by tissue conversion of structural analogues. It is suggested that this correspondence may hold true for a variety of species.

Caloric Intake and Biologic Value of Protein. Biologic values of soybean oil meal protein and of methionine-supplemented blood fibrin were determined with thirty weanling male albino rats by the nitrogen balance procedure. Each protein was incorporated into otherwise complete diets at a 10 per cent level. Food intake was regulated at 4.0, 6.0, or 8.0 gm. daily. At 4.0 gm. food intake, the biologic value of soybean protein and of methionine-supplemented fibrin was 59.1 and 74.3, respectively. At 6.0 and 8.0 gm. food intake, the values did not vary significantly between intake levels, and averaged 71.0 and 96.8 for the two proteins. The low biologic values obtained at 4.0 gm. intake are ascribed to utilization of a portion of the dietary protein for energy to support weight maintenance.

Utilization of Calcium. Calcium balances of nine college women consuming approximately 600 mg. calcium were studied in relation to period-to-period variation, source of calcium used to supplement a low-calcium diet, and the effect of basal metabolic rate on utilization. Approximately half the calcium consumed came from foods commonly served in American diets; the

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other half was supplied by milk to three subjects, calcium carbonate salts to three subjects, and calcium gluconate salts to three subjects. Analysis showed calcium from milk, calcium gluconate, and calcium carbonate were utilized equally well. Differences in balance from week to week were significant, but the relative importance of the time factor was reduced during the final two weeks from that in the preceding periods. Basal metabolic rate was inversely related to calcium utilization. In general, the basal metabolic rates were lower at the close of the study than at the beginning, and this may be related to the greater utilization during the final two weeks.

THE LANCET

No. 6859, February 12, 1955
* Nutritional cirrhosis. Editorial.—p. 337.
No. 6862, March 5, 1955
* Neuropathy in diabetes mellitus. J. D. Matthews. —p. 474.

Nutritional Cirrhosis. The correlation between cirrhosis and malnutrition in human beings is not as close as would be expected from work with laboratory animals. The inadequacy of malnutrition as a full explanation of the gross variation in hepatic disease in different parts of the world is especially well illustrated in a report on fibrosis of the liver in West African children in the Gambia. A survey of the food habits in this area leaves no doubt that malnutrition is a major factor; daily caloric intake ranges from 1570 in April to 1980 in December—shortly after the rice harvest, when the daily intake of protein (almost entirely of vegetable origin) does not exceed 50 gm. Fatty infiltration of the liver was not common at any of the ages studied—namely, from early infancy to twenty years. From this fact, it must be concluded that the diet, despite its obvious deficiencies in both quality and quantity, did not lack lipotropic factors. The prevalent hepatomegaly could not, therefore, be attributed to fatty infiltration, and there is no justification for regarding it as a precursor of cirrhosis, comparable with the large fatty liver in the rat. Neither malnutrition nor malaria can be held to account for the severe hepatic fibrosis in the older Gambian children. Perhaps, however, what neither does alone, may be done by both together, and the combination of malaria and malnutrition may account for the cirrhosis.

Neuropathy in Diabetes. Signs of neuropathy were found in 37 per cent of 545 diabetics with the incidence related to the patient's age; the duration, severity, and control of the diabetes; and the coexistence of vascular disease. Poor control is the most important factor in the development of neuropathy; 64 per cent of 237 patients with poor control had neuropathy, compared with 17 per cent of 308 patients with fair control. Also, of 55 patients less than fifty years of age (in whom senile neuropathy was unlikely), who had been poorly controlled, 89 per cent exhibited neuropathy.

NEW YORK STATE JOURNAL OF MEDICINE

Vol. 55, March 15, 1955
* Putting the vitamins in their place. J. H. Fryer. —p. 756.

Vitamins. A vast sum of money is expended annually on vitamins. Perhaps the major part of these products is bought without the specific advice of a physician. All vitamin requirements for most people can be met from the diet, the exceptions being in growing children, in some elderly people, and during pregnancy and lactation. Symptoms or signs suggesting subclinical vitamin deficiency warrant careful clinical assessment and not the empiric prescription of commercial vitamins. The points of view, "well, the vitamins are harmless" or "we might as well be on the safe side," are justified only in cases where known physical stresses exist. Applied in other circumstances, these dicta distract both patient and physician from the true cause of symptoms and also from the need to balance the normal diet so that the vitamins are obtained naturally. Vitamins prescribed in excess of requirements are no more effective than were the potions of 5000 years ago.

NURSING OUTLOOK

Vol. 3, March, 1955
* Meals on wheels. P. Jans.—p. 130

Meals on Wheels. Philadelphia's Lighthouse, a settlement house, has devised a program which helps older persons who are physically unable to buy and prepare their own food at home or to go out to a restaurant. These people are not sick, nor do they need to be cared for in institutions, but they have no friends or relatives to help them. "Meals-on-Wheels" is a program in which one hot and one cold nutritious meal a day is delivered to these people. Only those who cannot receive meals any other way are served by the settlement house. Volunteers help in the kitchen and deliver the meals. Paper plates, cups, and napkins are used, leaving only the silverware which requires washing. The meals are sealed in paper plates and packed in oven-heated, insulated bags, which are placed in an insulated container together with vacuum jugs of coffee and soup. Routes are planned so that the meals are received within an hour. Since the project is of a demonstration nature, a record is kept in conjunction with a research project headed by an instructor in sociology at the University of Pennsylvania. A careful check on the physical effect and value of the meals, as well as the emotional and psychologic responses of the persons served, is being made.

NUTRITION REVIEWS

Vol. 13, January, 1955
* Chronic protein malnutrition. J. F. Brock.—p. 1.
Comparison of thyroxine and triiodothyronine in man.—p. 4.
Physiologic adaptation in pregnancy.—p. 5.
* Advances in the study of body composition.—p. 9.
* Dietary factors and radiation damage.—p. 17.
* Some functions of dietary fat.—p. 25.

Chronic Protein Malnutrition. The Joint FAO/WHO Expert Nutrition Committee defines "protein malnutrition" as: "A state of ill health occurring where diets are habitually poor in protein, while they are more nearly adequate in calories. Clinically, protein malnutrition is most easily recognized when there is a relatively high intake of calories from starchy foods together with an insufficient intake of protein. The concept includes the effects of deficiency in the quantity of protein consumed, of imbalance of amino acids, and deficiency of factors, such as vitamin B_{12}, commonly found in foods in association with animal protein and concerned with protein metabolism." The question is discussed whether chronic protein malnutrition, as defined here, may not be a source of much chronic ill health.

Body Composition. Analyses of the body composition of a white male, forty-six years old, and definitely underweight, are reported. Fat (ether extract) accounted for 19.7 per cent of the gross body weight. Separable adipose tissue represented only 11.4 per cent of body weight. The skeleton contributed 17.6 per cent and striated muscles 39.8 per cent. The composition of adipose tissue was ether extract 71.6 per cent, water 23.0 per cent, protein 5.9 per cent, and ash 0.2 per cent. In the fat-free body mass, water accounted for 69.4 per cent, ash for 6.8 per cent, and protein for 23.4 per cent. Two new approaches to the measurement of body volume are described. An air-displacement procedure and gas dilution technique are proposed.

Dietary Factors and Radiation Damage. Dietary factors which may prevent or minimize damage from radiation injury are discussed. After a short period on an experimental diet, usually five days, mice were given 4.5 to 6.0 microcuries of P^{32} intraperitoneally per gram of body weight. The time required for 50 per cent of the mice to die, the per cent of the mice living after twenty-one days, and the average survival time were used as indexes in the evaluation of the various diets. A protective action was observed with a diet containing 10 per cent protein and 5 per cent fat. A high-protein, high-fat diet had a detrimental effect on survival. The addition of pantothenic acid to a diet deficient in this substance had a slight protective action in lowering mortality. It is suggested that pantothenic acid, pyridoxine, and the combination of folacin and vitamin B_{12} are active in delaying the lethal action of P^{32} in mice. The administration of choline, vitamin K, biotin, para-aminobenzoic acid, and alpha-tocopherol was not beneficial.

Functions of Dietary Fat. Several studies on the effects of fat on the diet are discussed. In one study, a statistically significant superiority of butterfat over corn oil was demonstrated on a vitamin E-supplemented ration with either lactose or sucrose as the dietary carbohydrate and containing TCP (tri-o-cresyl phosphate) and sulfathalidine. In another experiment,

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(Makes 2½ cups sauce)

1 large can (1⅔ cups) *undiluted* Carnation Evaporated Milk
2 cups sugar
3 squares (3 ounces) bitter chocolate

Combine Carnation, sugar and chocolate in saucepan over hot water or low heat. Cook about 15 minutes, stirring occasionally. Remove from heat; add one tsp. vanilla. Beat briskly until smooth and thoroughly mixed. For a thinner sauce, add undiluted Carnation Evaporated Milk to desired consistency just before serving.

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hydrogenated vegetable oil supported virtually identical serum tocopherol levels when either lactose or sucrose was employed as the carbohydrate. Corn oil supported normal levels of serum tocopherol only in the presence of sucrose. A study on the protective action of dietary fats against X-irradiation showed that 50- and 100-mg. daily doses of linoleate offered considerably better protection than 10 mg. Several other studies are briefly described.

PUBLIC HEALTH REPORTS

Vol. 70, March, 1955

* An outbreak of salmonellosis traced to watermelon. G. E. Gayler, R. A. MacCready, J. P. Reardon, and B. F. McKernan.—p. 311.

Garbage cooking in Iowa. E. R. Baumann and M. T. Skodje.—p. 314.

Salmonellosis Traced to Watermelon. An outbreak of gastroenteritis caused by *Salmonella miami* is described. There were seventeen primary cases among five families, and two secondary cases. The only article of food eaten in common was sliced watermelon which had been purchased from the same market. Symptoms occurred 12 to 24 hr. after the ingestion of the melon. *S. miami* was recovered from the sliced watermelon, from all of the stools submitted, and from the shelf in the store where the slicing knife was kept. No evidence of human or animal source could be found in the store. The melons were obtained from Florida, where *S. miami* is common, and the original contamination of the melons may have occurred there. Possible mechanics of the contamination of the watermelons are discussed. It is suggested that a knife, by cutting through a watermelon contaminated on the outside, could certainly inoculate the flesh of the melon. Thus, under conditions prevailing in supermarkets where melons are sliced for sale, infection could be spread unless knives are washed between cuttings. The possibility of contaminating melons with water injected to increase market weight is also raised. It does not appear, however, in view of the large sale of watermelons previously without reports of salmonellosis outbreaks, that watermelon constitutes a significant public health hazard.

THE ROYAL SANITARY INSTITUTE JOURNAL

Vol. 75, January, 1955

* Bread and public health. D. W. Grover.—p. 68.

Vol. 75, February, 1955

* The bacteriological purity of ice-cream brickettes and their method of manufacture. K. A. Hyde.—p. 157.

Bread and Public Health. The discussion is confined to chemicals added to bread or flour to improve palatability and to increase its sales appeal. Chemical improvement has been practiced for many years without any evidence of deleterious effects on human health. However, flour treated with nitrogen trichloride has been proved to be toxic to dogs, and its use as a bread improver in the United States and United Kingdom is being discontinued. Medical and technical authorities are very much alive to the problem and are now obtaining a clear understanding of the nature of flour improvement. There is some prospect of being able to change the process so that chemicals become unnecessary. It has also been found that comparatively small additions of emulsifying agents to bread help to maintain its "softness" longer. The most important of the surface-active compounds which have been used in bread are glyceryl mono- and di-stearates, polyoxyethylene mono-stearate, sorbitan monostearate. Of these, glyceryl mono- and di-stearates are very closely related to edible fats and are often present in naturally occurring fats, and there seems to be good reason for accepting their use.

Bacteriologic Purity of Ice Cream Brickettes. To give freedom from hygienic hazards, a "soft wrap" process for ice cream brickettes was evolved. It consists of depositing portions of ice cream of the shape and size required on a strip of waxed paper passing continuously beneath a vertical extruding head, the individual portions being severed by a pair of mechanically-operated stainless steel wires. Stainless steel guides immediately fold the paper over the ice cream and completely cover it. The paper is then heat-sealed in the spaces between the portions of ice cream and finally cut mechanically, giving individually wrapped portions which are hardened and packed completely protected from any contamination. Bacteriologic results from approximately 10,000 routine factory control samples over four and a half years show the soft wrap process to be greatly superior, hygienically, to traditional processes.

SCIENCE

Vol. 121, March 25, 1955

* Nutritional changes in diets exposed to ethylene oxide. E. A. Hawk and O. Mickelson.—p. 442.

Antithiamine Effect of Ethylene Oxide. This paper presents evidence that when diets are treated with ethylene oxide, nutritional properties are impaired. Ethylene oxide has been used as an insecticide and bactericide, and it has recently been suggested that it may be suitable as a sterilizing agent. The experiments were conducted with the diets of rats. Analyses of the diet treated with ethylene chloride indicated that the thiamine was almost completely destroyed. Animals that had lost considerable weight on this diet gained an average of 38 gm. during the first week of oral supplementation with thiamine. Supplements of a complete vitamin mixture produced essentially the same results. The authors emphasize that they have not determined the effects of ethylene oxide on foods intended for human consumption or on practical animal foods other than their stock diet. Nevertheless, they suggest that foods, particularly those that may be major sources of essential nutrients, should not be subjected to ethylene oxide treatment until its effects have been established.

SOUTH AFRICAN JOURNAL OF CLINICAL SCIENCE

Vol. 5, September, 1954

* The assessment and management of fluid and electrolyte requirements in surgical patients. R. E. Bernstein.—p. 131.

Fluid and Electrolyte in Surgical Patients. The following guides to treatment are stressed: (a) individual therapy; (b) replacement of large losses with regard to composition; (c) recognition and judicious treatment of potassium deficiency; (d) avoidance of large quantities of intravenous salines or glucose without knowledge of the patient's fluid and salt loss; and (e) dangers of overloading the circulation in older patients and children. The immediate aim is to restore the circulating blood volume to adequate levels by correcting the deficit in volume and composition. Provision of fluid and electrolytes cannot be considered apart from calorie, protein, and other nutritional requirements. Improvement, by chemical evaluation, may not be followed by clinical improvement. For this reason, clinical and chemical assessment of the patient's response to therapy should be periodic and collaborative. It is stated that feeding by intragastric tube can tide the patient over the immediate postoperative period, when his weakness and particular habits of diet are responsible for a reduced intake of food.

THE TOHOKU JOURNAL OF EXPERIMENTAL MEDICINE

Vol. 61, December, 1954

* Studies in blood glycogen. The 4th report. Blood glycogen content in diabetes mellitus and alloxan diabetes. S. Yamagata, Y. Satô, and S. Nishiyama.—p. 7.

Blood Glycogen in Diabetes. According to the classification of the clinic where the study was conducted, patients with diabetes mellitus can be divided into two types: Type I can be cured by diet therapy alone (carbohydrate 300 to 350 gm., fat 20 to 50 gm., protein 70 to 100 gm.), while Type II can be cured by the same diet therapy with insulin injection. Of Type I patients, 25 per cent revealed blood glycogen values of over 75 mg. per 100 cc., but 32.1 per cent of Type II showed higher values than the normal value and 7.9 per cent had lower values. The blood glycogen content for Type II tended to increase when complications occurred. As the condition of Type II patients improved, the blood glycogen content seemed to become normal at the same time that the blood sugar normalized.

ADULT LEADERSHIP

Vol. 3, April, 1955

* Hand-picking your audience. F. L. Harrison.—p. 11.
* How to use a consultant. N. McKeever.—p. 14.
* Stresses in consultation. W. W. Charters, Jr.—p. 21.
* The personal touch. J. S. Kounin.—p. 23.

Hand-Picking Your Audience. The secret of obtaining distinguished

Meat...

and the Problem of Senile Osteoporosis

Perhaps under the still-persisting influence of the mistaken "health legends" of former days, many older people tend to eat less meat and other nutritionally valuable protein foods than they should; thus, the osteoporosis that occurs naturally in the aging body may be unduly augmented.[1]

A balanced diet supplying optimal amounts of protein is essential, and appears to be useful in preventing and in slowing the progress of osteoporosis in senile persons. Adequate protein intake is instrumental in supporting osteoblastic activity so necessary for production of osseous matrix. "When osteoporosis is present, the prime objective is an adequate, high protein diet (a gram or more [of protein] per kilogram of body weight), to aid in building bony matrix for osteoblastic activity."[1]

Meat constitutes one of the most important sources of protein in the nutrition of the aged. Meat offers biologically effective protein—effective in the maintenance as well as the reconstruction of wasted or damaged tissue. Its natural content of B vitamins and of essential minerals not only helps to supply the daily needs for these nutrients, but is necessary for the proper utilization of amino acids.[2]

The appealing taste of meat, its appetite-stimulating quality, and its almost complete digestibility also are important in geriatric nutrition.

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1. Rechtman, A. M., and Yarrow, M. W.: Osteoporosis, Am. Pract. & Digest Treat. 5:691 (Sept.) 1954.
2. Cannon, P. R.; Frazier, L. E., and Hughes, R. H.: Factors Influencing Amino Acid Utilization in Tissue Protein Synthesis, in Symposium on Protein Metabolism, New York, The National Vitamin Foundation, Inc., 1954, pp. 55-90.

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speakers is hand-picking an audience, that is, to make sure the audience is responsive and produces within itself a group experience that is valuable. When an organization obtains a distinguished speaker, it should take account of the success or failure of the particular meeting, by asking the following questions: (a) Was the size of the group adequate to the purpose? (b) Did the group represent a wide range of experience and educational and economic backgrounds, and have the participants a recognized place in some organization? (c) Did the group really have a chance to exchange views and thus widen its reaction to the speaker or speakers, and also have an opportunity to talk to those they came to hear? (d) Did the participants do something about the question later? A program director for an organization must not only provide the organization with able speakers, but must also provide the speakers with an audience that will make the speakers' time worth while.

How to Use a Consultant. Consultation is not a substitute for proper program planning, but rather an aid to it. Therefore, when asking for consultation we should ask ourselves: Why do we want it? What are the barriers to the job we want done? Have we taken every opportunity to use our own knowledge and skills? What additional knowledge and skills seem to be needed? Who are the people who can help us most effectively in this situation? From these questions we can find out what we need and what we want in a consultant. Once we determine that, we must help the consultant to help us. He must know what is expected of him and what problems are anticipated. Then he can decide how to proceed. When we initiate the request for consultation, we are eager and ready to learn, but if consultation is given when it is not asked for, we often become suspicious that someone thinks we are not measuring up to standard. Then we become defensive and begin to justify our mistakes. Consultation can be a two-way process through which both the consultant and the consultee can gain. If we are sound in our planning, objective in defining our goals, careful in determining the skills and abilities needed, wise in selecting the person, thorough in briefing, and incisive in analyzing the help given, growth takes place in all concerned.

The Personal Touch. A consultant may be an able man in his specialized field, but unless good relations between him and his client are established, no problems will be solved. Both the consultant and his client have certain commitments to make to each other in regard to solving a problem. The client should have a willingness to commit himself to the consultant through willingness to maintain contact and willingness to be influenced. The client and the consultant should, of course, understand each other. The consultant should assign importance to the client's problem and indicate a desire to maintain communication by listening attentively, remembering what the client has said, and showing a continued interest in the client and his problem. This type of understanding is not enough, however, for there is also a social relationship between the client and the consultant. Too often professional helpers, in their zeal to be regarded as competent and expert, fail to show the expected amount of cordiality, with the result that clients feel ill at ease with them and do not feel that they are really interested in being helpful. Actually, the whole situation works two ways: the client and the consultant must commit themselves to each other, and each gets better satisfaction if he feels that the other has commited himself.

CHILDREN

Vol. 2, March-April, 1955

* Better nutrition for Puerto Ricans. E. S. de Zayas.—p. 63.

Better Nutrition for Puerto Ricans. Poor nutrition and nutritional deficiencies are recognized as two of Puerto Rico's major health problems. To improve the situation, an active campaign designed to reach down into the schools and home life of the people is being waged. Consumption of protective foods, such as milk and fresh vegetables, is low, and there is a great lack of high-quality protein, vitamin A, and calcium in the diets. Fads and fallacies concerning foods also affect the diet, and many nutritious foods are shunned because of superstition. In an effort to combat these conditions, children are now being taught in school how to grow nutritious foods, and courses include rabbit and goat raising and vegetable gardening. Feeding programs for school and preschool children are also in operation. The Basic 7 chart of the U. S. has been adapted to conditions on the island and reduced to what is now known as the Basic 4. A carefully planned poster and simply written pamphlets elaborate this plan. Rice and wheat-flour enrichment is required by law in Puerto Rico, and other legal stimulation to good diet is being promoted. That the program is successful is seen in the fact that today many foods may be bought in the native markets which ten years ago were unavailable because of lack of demand.

COLLEGE AND UNIVERSITY BUSINESS

Vol. 18, March, 1955

* More effective methods of food service inventory. H. P. Wagner.—p. 50.

Vol. 18, April, 1955

* How to establish job training program. K. Bruce. —p. 46.

* Cost accounting for food operations. D. C. Osterheld.—p. 49.

Food Service Inventory. At the University of Michigan, perpetual inventory and periodic physical inventories are operated jointly in the food service. This method uses these basic principles: (a) the first-in, first-out method; (b) the lot number method, with a number designated for each day of the year, numbers ranging from 1 through 999, lower numbers indicating the oldest stock; and (c) a rotating physical inventory taken three times a year. As soon as the physical inventory is made, it is verified against the perpetual inventory record. Any marked discrepancy between the inventory record and the floor stock receives careful scrutiny. The advantages of the method are many. The peak load created by a year-end complete physical inventory has been eliminated, and there is less interference with normal operations. The rotating method of checking makes it easier to determine causes of discrepancies, and they in turn are located and corrected before becoming too serious. Pilferage is reduced because employees are more aware of continued vigilance and the likelihood of early detection. Experience built up over several years, not easily obtainable from an annual inventory, can be derived from rotating inventory cards which help locate weaknesses in methods of filling orders and of recording all phases of merchandise operations.

Job Training Program. General problems for most job training programs are: (a) insufficient time; (b) lack of understanding and cooperation between employees and management, and (c) lack of support and continuous effort. To establish a training program, management should: (a) analyze present methods of operation, (b) encourage employee participation, (c) identify the definite job problems and areas needing improvement, (d) set up a target of aims and objectives, (e) decide on best methods of obtaining objectives, (f) place the solutions in writing, (g) keep the employees involved in current situations as they develop, and (h) follow through with the program as a whole. This approach will obtain employee interest and active participation in the business.

Cost Accounting in Food Operations. There are four important points in cost accounting of food operations: (a) departmentalization; (b) knowledge of total costs; (c) recognition of the importance of wage cost control; and (d) procurement and use of comparative cost data. Many operators have been using systems in which operating costs are treated only in totals of all types of services offered, whereas each part of a food operation should be studied and analyzed separately. Analyzing wage costs should be done daily, at least on a sampling basis, and there should be an effect on pricing of the change in ratio of expenditures for food and wages. Wage cost depends also on reducing personnel sufficiently to keep the cost in line. It is often helpful to exchange comparative cost data with other institutions, but these factors must be considered in using such data: (a) geographic location; (b) size of college or university; (c) kind of school (residential vs. a commuting type) and, (d) size and type of the physical facilities.

FOOD ENGINEERING

Vol. 27, March, 1955

Setting pay rates on workers' merits. I. C. Miller.—p. 57.

* Automatic remote heating cures frying faults. H. L. Smith and W. E. Freeman.—p. 60.

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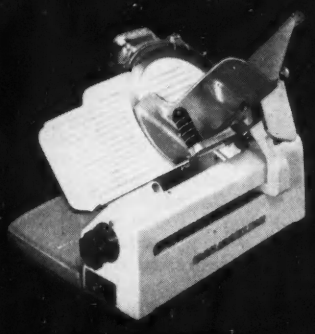

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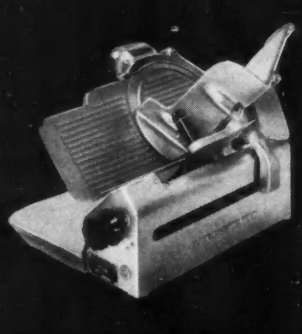

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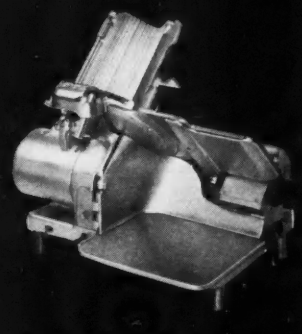

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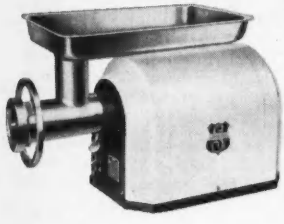

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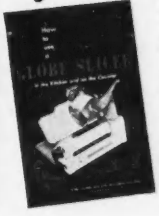

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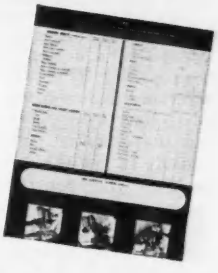

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* Advanced machines do it again. J. V. Ziemba.—p. 68.
* Superior dehydrated juices from continuous vacuum process.—p. 71.
Armour pioneers breaded meats. FE staff.—p. 77.
* Dry frozen dessert mix solves user problems.—p. 83.
Caramel color—its properties and its uses. F. W. Peck.—p. 94.
Radiation costs calculated in pilot-plant program. M. R. Jeppson.—p. 100.
Vol. 27, April, 1955
* Evaluating safety of chemicals in packaging materials. B. L. Oser.—p. 57.
* MSG has "staying power." M. P. Kearns, I. S. Fagerson, and C. R. Fellers.—p. 76.
* Practical tips on care of stainless equipment. B. Buchalter.—p. 78.
* Rosy future for frozen foods keyed to heat-eat items.—p. 87.
* Water treatment is a 'must' in the modern food plant. E. Nordell.—p. 89.

Remote Heating. By means of a radically different deep-frying process, big strides have been taken in quality, capacity, safety, and efficiency in potato chip production in an Atlanta plant. The quality of the produce is improved since the oil is not heat-damaged.

Advanced Machines. Frankfurter links are formed on a twist-and-spin principle at a meat packing company in Chicago where new machines both link sausages and strip the casing. This may influence the price of these products. The new machines produce links of more uniform appearance and length.

Superior Dehydrated Juices. Today dehydrated orange juice is again being processed commercially—this time with achievement of both process and product advantages over the earlier endeavor during World War II. Product improvements include complete elimination of water content from the juice; instantaneous reconstituting of dehydrated juice crystals, even in ice water; recovery of natural orange flavor through addition of stabilized recovered peel oils; high retention of ascorbic acid (at least 96 per cent of the vitamin in the concentrate); and flavor approval. Although the vacuum process requires considerable capital investment, processing costs of the dehydrated products are modest, and storage and distribution costs are materially lower than those of competing products. Shipping-weight saving of the dry crystals, as compared to single strength juice, is 86 per cent; storage space saving is 77 per cent; and handling cost savings are 82 per cent. Also, the dry products require no refrigeration.

Dry Frozen Dessert Mix. The problem of spoiling by having too much liquid frozen dessert mix on hand has been solved by a dry mix. The only difference between the liquid and dry mix is that the dry contains more fat and less milk solids. Previously it was difficult to get the dry mix to whip up properly when run through the freezer, but now a vegetable protein extractive is added, which helps to give the dessert a fine, even texture, the desired over-run, and it stabilizes both vegetable and butter fats. The mix is packed in polyethylene-lined bags and will remain stable for several months at normal summer temperatures. Although the mix is pasteurized when in original liquid form and then spray dried, some states require that the reconstituted product be pasteurized. Most freezer operators don't have the facilities for such. This is the one flaw in the use of the mix.

Chemical Safety in Packaging Materials. Long shelf-life for packaged foods presents the problems of stabilization against the ravages of heat, light, oxygen, humidity, and pests. Food packages are made from: wood, paper, fabric, glass, metal, rubber, and plastics. Also, lacquers or enamels are used for lining cans and other substances. Section 402 of the Food, Drug and Cosmetic Act states that a food is deemed adulterated if its container is composed in whole or in part, of any poisonous or deleterious substance which may render the contents injurious to health. With the aid of the chemical, packaging, and food industries, scores of compounds used in packaging have been evaluated. Appraisal of the acceptability of a chemical component of a food wrapper or container from the safety standpoint requires answers to two questions: (a) is it "poisonous or deleterious"? and (b) is it added to food? If both questions are answered affirmatively, it is necessary under the law to establish necessity or unavoidability. Then data based on toxicologic, analytical, and technologic evidence are needed. Every food, chemical, or packaging manufacturer who is responsible for the use of new chemical additives in packaged food products, is confronted with the complex problems involved in their safety.

"Staying Power" of MSG. After confirming that monosodiumglutamate (MSG) benefits the flavor of frozen vegetables, seafood, meats, and poultry, the question "What is the minimum amount of MSG necessary to improve the flavor of these foods during a year's storage?" arose. Research showed that not only did the addition of the proper amount of MSG improve flavors, but also that this improvement was still apparent after a year's storage. The food packer is assured, then, that his product will reach the consumer—several months after packing—with a better flavor because of the added MSG. Tested for MSG flavor retention were haddock, clam chowder, chicken à la king, rosefish fillets, beef stew, and codfish cakes. The approximate costs of treating 100 lb. of each product with MSG was low, beef stew at ⅔ cent per pound being the highest. A trained and experienced taste panel determined palatability or acceptability. Charts showing the comparative results of the tests are included.

Care of Stainless Steel. To insure desired extra years of trouble-free performance with stainless steel units requires strict observation of the rules of sanitation and maintenance specifically set down to prevent corrosion, to keep contaminants from accumulating, and to curb growth of micro-organisms. Stainless steel, with alloys of chromium and iron, provide excellent resistance to corrosion and heat. The further addition of nickel to this chromium-iron alloy provides a resistance to both oxidizing and reducing solution, plus a more rapid development of passivity (inertness). When stainless steels corrode, it is usually due to the loss of this passivity, possibly over only a very small area, and pitting develops. Passivity depends on an adequate supply of oxygen; thus, if debris of any kind, or even dust, is allowed to collect on the surface, the accessibility of oxygen is reduced. Ordinary washing with mild soap or detergent and bristle brush will generally give ample protection. However, corrosion also depends on the quality of the stainless steel. It is vital that all equipment be thoroughly inspected before it is put into service to detect any surface flaws. These flaws should be corrected by simple cleaning or polishing where necessary. The equipment should also be protected from contamination by being placed where it will not come into contact with contaminating substances, such as rust, iron-containing cleaners or polishes, or ordinary steel wool.

Future for Frozen Heat-Eat Foods. At the National Frozen Food Convention, the prepared heat-and-eat items were reported to be the industry's "star performers." Fish sticks, for example, rose from 7.5 million lb. in 1953 to 50.1 million in 1954. Production of frozen pies was 35 million and cooked-potato output —in French fried and other forms— totaled more than 80 million. Predictions include a frozen heat-and-eat pancake, and there was talk of frozen concentrated milk appearing on the market within five years. The future for frozen products is extensive, although even now a great percentage of the nation's food products are sold in the frozen state. Future opportunities also bring future problems. Packers will be taking on greater responsibilities when preparing frozen precooked, preseasoned, prepackaged, and ready-to-serve foods than when making individual items. There are advantages in freezing such foods in that more variety can be obtained, and by-products, such as gelatin from chicken, seasoning paste, concentrated broth, fat, and concentrated soup, may be prepared. The real problem in freezing prepared foods is retaining a balanced flavor. This is illustrated in sausage, barbecued meat, stuffed turkeys, or cured meats. In most cases, flavors to be added must be kept in balance throughout freezing, storage, and consumer preparation. It was emphasized that more research was needed on off-flavoring in many products. Selection of the foods for freezing is also a big problem. While many foods might have an acceptable fresh market, they may not be successful when frozen.

Water Treatment. Soft water can cure scale troubles, save on detergents, and abolish unsightly deposits on products and containers. In one dairy plant, the largest factor which was directly due to hard water was scale formation in the water heaters, hot water lines, bottle washers, pasteurizers, and steam boilers. Removing the scale was a constant, never-ending job, because as soon as it was removed, more scale appeared. Since a water softener has been installed, cleansing in the whole plant has improved. money has been saved, not only in cleansing, but in the detergent and in the fuel costs.

Kellogg's
QUICK QUIZ
FOR DIETITIANS

Can you prescribe the right cereal for these special diet problems?

(Check your "prescriptions" with the answers below)

A. Low Sodium

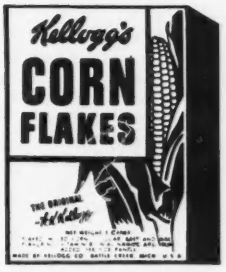
B. High Vitamin

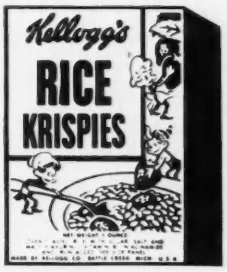
C. High Protein

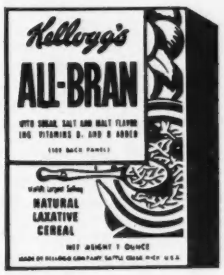
D. Bland

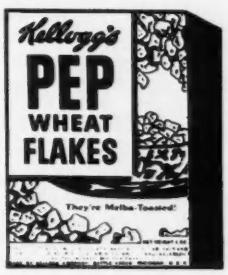
E. Wheat Allergy

F. High Residue









Just what the doctor ordered!

All Kellogg's cereals—all 12 of them—are made from pure whole grain . . . or restored to whole grain nutritive values. You were 100% correct if you prescribed these cereals: A. *Low Sodium*—Shredded Wheat (.001 sodium grams per oz.); B. *High Vitamin*—Pep (400 IU Vitamin D, .25 mg. Thiamine); C. *High Protein*—Corn Soya (5.10 grams of protein per oz.); D. *Bland*—Rice Krispies; E. *Wheat Allergy*—Corn Flakes (wheat free); F. *High Residue*—All-Bran (2.40 grams of fiber per oz.)

Kellogg's
OF BATTLE CREEK

FOOD SERVICE

Vol. 17, March, 1955

* Interview on sanitation. W. L. Mallmann.—p. 18.

Sanitation. Primary protection against disease in the food service business is equally important in the kitchen, dishroom, and dining room. Good sanitation is possible even without automatic disposal equipment. Hot water is more important than chemical detergents in dishwashing, since the heat penetrates through the dish for effective killing of organisms. It also aids in sanitation of glassware as well as in drying. The general sanitation program is influenced by the floor, wall, and ceiling surfaces in the establishment. Acoustical materials are quite satisfactory, provided fumes and vapors are properly vented from the room. There has been a marked movement to increase personnel training in regard to sanitation in recent years. An attempt at establishing sanitary conditions is useless without the education and cooperation of the personnel. This article covers many points in which a progressive food manager will be interested.

FORECAST FOR HOME ECONOMISTS

Vol. 71, April, 1955

* New benefits from new bread. J. Grant.—p. 20.

Benefits from New Bread. One recent development in the effort to improve bread has resulted in the "Cornell Formula," worked out by Dr. Clive McCay, Professor of Nutrition, Cornell University. The formula provides for the replacement of 16 per cent of the enriched wheat flour by 2 per cent wheat germ, 6 per cent soy bean flour, and 8 per cent powdered skim milk. The formula is available to all without charge. This bread can be produced in commercial bakeries for only 2 cents a loaf over the cost of standard enriched bread. Growth studies with rats have demonstrated the superior nutritional qualities of this bread. The formula for three loaves is given.

HOSPITAL MANAGEMENT

Vol. 79, April, 1955

* Don't build a diet on calories alone. K. Nussbaum.—p. 90.

Human Elements of a Diet. Because psychologic factors play such an important role in the management of food, the dietitian would do well to recognize them and consider them in working out patients' diets. Emotions in regard to food frequently go back to infancy, and many of the gastro-intestinal diseases have psychosomatic aspects. Good rules for the dietitian to follow are: (a) have respect for the patient, and always, even if his attitude seems unreasonable or uncooperative, try to understand his deeper feelings; (b) don't work out a diet in exact doses, as if it were medicine; (c) whenever possible, discuss the food and diet with the patient, allowing him to express freely his own feeling; (d) remember emotions play an important role in all types of gastro-intestinal illness, not just those caused by emotional troubles; (d) make the food attractive; (f) allow sufficient time and relaxation for both employees and patients at mealtime; and (g) use group therapy where possible.

HOSPITALS

Vol. 29, April, 1955

* What we need is research. M. K. Bloetjes.—p. 112.

Need for Research. American colleges and universities offer curricula particularly designed to prepare the student for efficient management of quality meal production as well as nutrition. As these curricula expand, the need and opportunities for research become more evident. Such research should be focused on further application of recently developed business and engineering principles. Hospital meal production is characterized by complex menu items with numerous ingredients. This complexity, plus the nutritional calculations involved in diet therapy, entail mathematical procedures which cannot be adequately executed by manual calculating procedures within the allotted time spans. Accordingly, attention is now focused on developing techniques by which these calculations may be done more rapidly. The results of such mathematical research, if applied to nutritional calculations, could enhance the accuracy of these calculations. The use of pre-packaged, portioned, frozen, and other types of preserved foods is greatly reducing the space needed in the food production unit. Application of the research studies in this area would safeguard the dietitian, the administrator, and the hospital consultant from purchasing unnecessary equipment. Flow process charts showing the flow of goods from the vendor to the point of service need to be developed. This information would also serve as a guide in more accurately estimating the kinds of equipment required, based on food production procedures. Temperature control is a major factor in hospital food service operations. Studies in thermodynamics may well furnish standards by which one may satisfactorily estimate the proper distance and length of time for transportation of food from the kitchen to the patient's bedside.

HOTEL MANAGEMENT

Vol. 57, March, 1955

* Do it with pictures. W. B. Pfeiffer.—p. 64.

Soups. M. L. Casteen.—p. 76.

Using Pictures. A hotel in Tennessee uses 4 x 5 in. color transparencies to promote uniformity in appearance, arrangement, and portion sizes of food. Photographs of table service may be used to train waitresses.

INSTITUTIONAL FEEDING AND HOUSING

Vol. 4, April, 1955

* What you should know about asphalt flooring. J. Wright.—p. 20.
* Air conditioning is important for your business.—p. 38.

Asphalt Floors. Asphalt tile is the most popular of the resilient floors. It can be installed over any smooth, solid floor. Made principally or wholly of asbestos fibers, mineral pigments, and resinous binders, it is decorative and at the same time very abuse-resistant. It lacks the elasticity of other types of flooring, but is more resistant than others to decay and damages, such as scratches, tears, and other scars. Although it melts under extreme heat, it is fireproof. It is especially suited to damp locations. Installation differs from other resilient floorings only in that it requires a smooth, level sub-floor. Asphalt tile floors should be cleaned with mild cleaners for best results. Dry steel-wooling of asphalt tile is recommended, but the steel wool should be of a fine grade. A water wax heightens the appearance. Solvent type waxes, including paste wax, should be avoided, for they dissolve asphalt tile, as do solvents, gasoline, naphtha, turpentine, oils, and greases.

Buying Air Conditioning. Air conditioning is no longer a luxury in the restaurant business, but a competitive necessity. It improves employee morale and decreases absenteeism. It does more than just lower the temperature; it simultaneously controls temperature, humidity, ventilation, circulation, and cleaning of air. The load of an air conditioning unit can be reduced by such things as shading window areas, using double glass or glass blocks in windows, and insulating the roof. These steps reduce the cost of the air conditioning unit and also cut the heating bill in winter. There are three different types of equipment: the small, self-contained or package unit; self-contained industrial unit; and the built-up or central system. Annual cost for replacement parts should not exceed 1 per cent of the installed cost of the equipment. The proper air conditioning can be a dividend-paying investment, in both employee and customer satisfaction and relations.

INSTITUTIONS MAGAZINE

Vol. 36, April, 1955

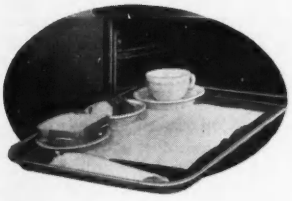
* Outlines procedure for dishwashing machine operation. W. H. Haskell.—p. 36.
* Finds food-cost methods of menu-pricing outmoded. J. W. Stokes.—p. 42.
* Traces geneology of 'the compleat kitchen.' D. E. Lundberg.—p. 52.
* Reviews preservation methods for foods in storage. M. Wilson.—p. 60.
* Experts pool skills to design food facilities.—p. 136.
* Profit through formula cooking. H. P. Caleva.—p. 142.

Dishwashing Machine Operation. When an institution purchases a dishwashing machine, it may assume that this piece of equipment is adequately constructed to wash and sanitize dishes. However, certain operational and maintenance necessities must be carried out if these machines are to perform efficiently. One of the main requirements is hot water. Often a booster heater is required. An important factor in keeping the machine in good running condition is pre-cleaning and pre-scraping of

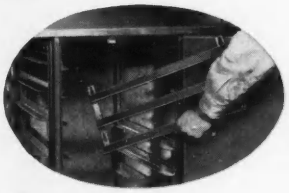
IDEAL
MEALMOBILES
to help solve your food serving problems

HEATED DRAWER SECTION
Large heated drawers, ventilated for even distribution of heat, carry up to three 9" food plates with side dishes. Heated section fully insulated with Fiberglas.

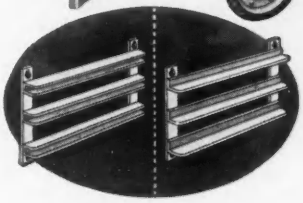
DOLE HOLDOVER PLATES
To preserve frozen desserts and other foods Dole Plates are provided, and these plates fit on the regular tray supports. They also serve to cool the compartment below them.



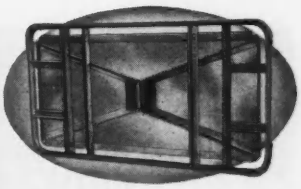
COLD COMPARTMENT
Holds from 9 to 12 trays depending on the model of the unit. Accommodates trays of all sizes up to 15¼"x20½".



REMOVABLE TRAY GUIDES
Adjustable tray guides can be easily removed leaving the entire interior completely accessible for thorough cleaning with steam or detergent.



TRAY AND SHELF GUIDES
Tray guides are supplied in 2 designs for pull-type drawers and trays, and for refrigerator-type shelves. Either type may be selected.



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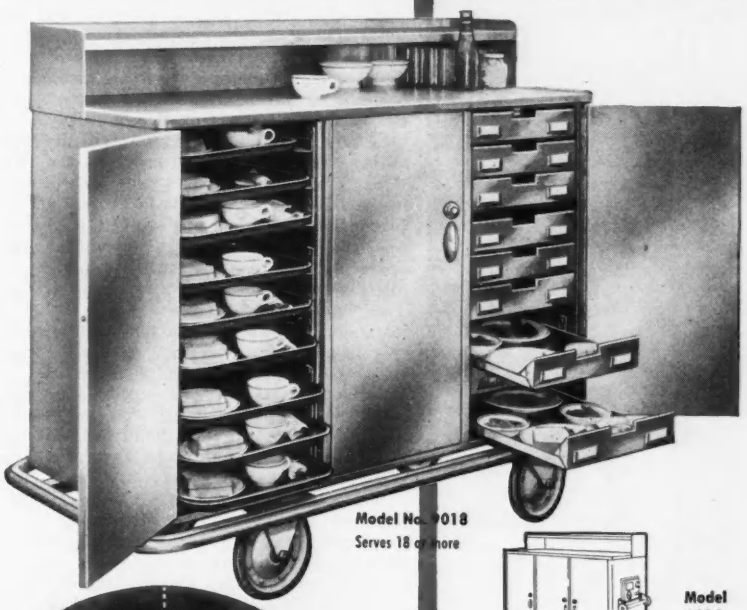

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CASTERS
Eight-inch ball bearing rubber tired wheels are scientifically engineered for perfect balance and easy mobility.

REPLACEABLE BUMPER GUARD
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IDEAL Mealmobiles, made only by Swartzbaugh, enable you to extend "kitchen control" to your patient's bedside. You can now easily serve kitchen-fresh, appetizing meals — with hot foods hot and cold foods cold — anytime, anywhere. New IDEAL Mealmobiles are available in four models, and are designed to deliver plates and trays of hot foods and cold dishes for 18 to 32 meals. *(Patents Pending).*

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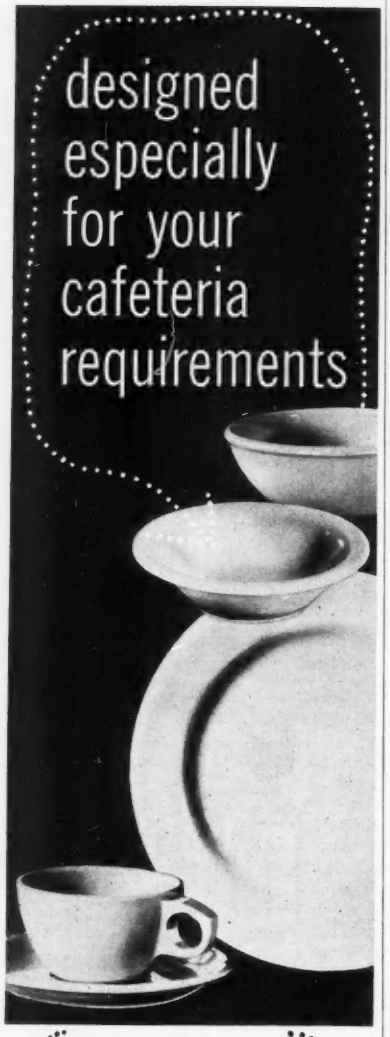

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dishes, as in hand washing. This prevents clogging of spray nozzles and keeps to a minimum the bacterial content of the wash water. Proper stacking of dishes and control of detergent strength are also important. Detergent dispensers, if installed and adjusted, should not be tampered with and should be cleaned regularly. Sanitary regulations, such as temperature of the rinse water, should be followed exactly, and toweling after sanitizing should not be allowed. Finally, personnel employed to operate dishwashing machines should be carefully selected and carefully supervised.

Menu-Pricing Outmoded? The generally accepted method of setting menu prices is to determine first the raw food cost of a particular item, then multiply by a pre-determined ratio to obtain the selling price. The author questions the validity of this method in view of the increased importance of labor costs (when the old method was evolved, food was the major cost in a restaurant operation) and also the fact that many foods today are delivered prefabricated. There is also the problem of items—for instance, milk—which are not sold on this formula, for the price cannot be raised to the proper level because of consumer resistance. The author suggests that, since prefabricated items require little labor, they could be sold at a lower price and probably would attract more business.

Geneology of the Complete Kitchen. Today modern institutional kitchens with their quantity of stainless steel in the form of ranges, rows of steam-jacketed kettles, thermostatically controlled deep-fat fryers, thermal containers, automatic coffee makers, electrical vegetable peelers, and hundreds of cubic feet of refrigerator space are a far cry from the kitchens of yesteryear (and not going back too far). In the time of Henry VIII, kitchens were dirty, germ infested, and smokey, and the kitchen workers were the "low men on the social totem pole." Equipment was scarce, and even in the seventeenth century, cooking pots were scarce and precious items, handed down from generation to generation and commonly listed with the valuables in wills. Many colonial kitchens in taverns and large homes had an array of hand-made gadgets, such as cheese presses, sausage stuffers, cabbage shredders, and waffle irons. About 1800 saw the forerunner of the food assembly line, a team of five bakers who turned out seventy strips of biscuits a minute for the king's navy. Scientific improvement in kitchen equipment was advanced by two colorful chefs, Count Rumford and Alexis Soyer. Rumford invented, among other things, the "drip" coffee pot, steam-jacketed kettles, and the double boiler. Soyer was one of the first chefs to use gas for cooking. Among his inventions were a teapot, vegetable drainer, a patent egg cooking machine, a cooking clock, baking-stewing pan, and his famous camp stove.

Preservation Methods. Preservation methods for foods include: (a) refrigeration, (b) drying or dehydrating, (c) canning, and (d) freezing. These are discussed, along with specific instructions for storing various fruits and vegetables. Three tables include: (a) storage temperatures for food products, including meats, poultry, fish, dairy products, fruits, vegetables, and miscellaneous products; (b) monthly availability of some fruits and vegetables; and (c) safe storage duration of various products.

Pooled Skills for Expert Design. Dietitians, architects, and superintendents used these four questions as a basis for planning a new food service unit at Cleveland City Hospital: (a) What services would be included in the building? (b) What were the plans relative to actual food production? (c) Should the present menu pattern be maintained? (d) What do we wish to accomplish with this new installation? Storage space and work flow were studied carefully. The addition of freezing facilities helped considerably in improving storage space. The result of the planning was excellent work flow and sanitation provisions, and smooth and efficient operation. The article is illustrated with photographs and contains a floor plan of the dietary area.

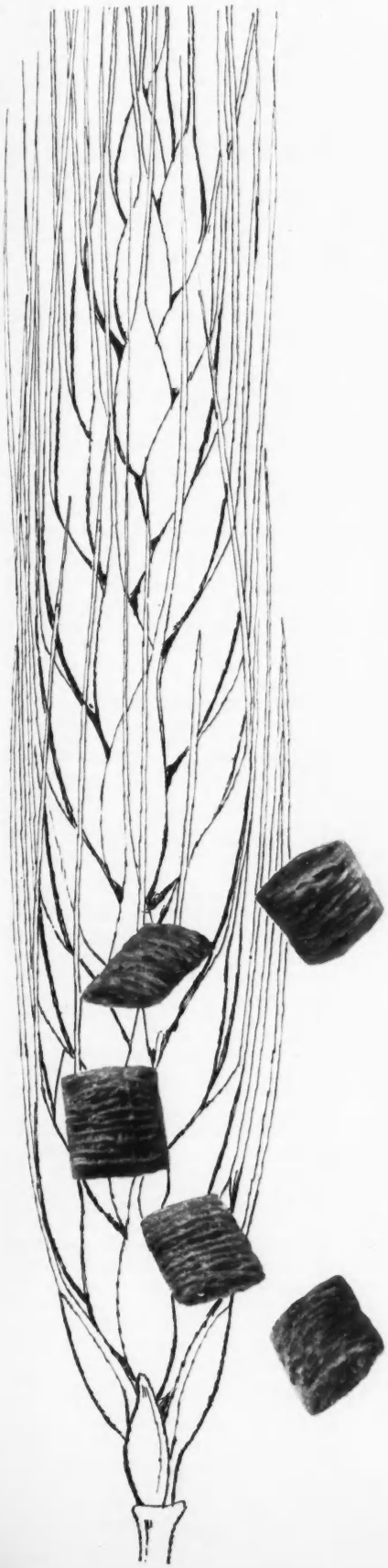
Profit through Formula Cooking. The main requisite for formula cooking is simplicity of operation and of execution. Management should plan the menu with the chef on Monday, for instance, for a full week. Once planned, the menu is turned over to a food supervisor, who does the paper work. The basic menu formula is converted to a working formula, and the work load is distributed. Required merchandise to be purchased should be itemized, and every kitchen employee should know when, how, and what he is to do. In addition to installing formula cooking, food production should be standardized as follows: (a) organization of the kitchen, which includes preparation of a general organizational chart and departmental chart; (b) food preparation, which includes standardization of food items and portions; (c) raw materials, which includes making of specifications covering type, size, and description; (d) methods of planning, which includes a book of standards outlining the function of employees; (e) employee standards of performance, which will help management to allocate and route employee work loads equitably; (f) wage standards, which include definite rate scales for persons on trial, apprentices, regular employees, and overtime help; and (g) quality standards, where there must be definite specified inspection procedures to assure uniformity and quality of menus and meals.

THE MODERN HOSPITAL

Vol. 84, April, 1955

* Put variety in those vegetables. J. M. Rock and D. H. Zumsteg.—p. 112.

Variety in Vegetables. Vegetables are relatively cheap and offer variety for menus, but seem to rate less attention than other foods in institutional food service. Vegetables should be cooked



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with as little water as possible (just enough to cover them) and transferred immediately to serving pans to avoid loss of flavor, color, and nutritional value. This is important with frozen, canned, and dehydrated vegetables alike. In all types of vegetable cooking, pans should not be overloaded. This deteriorates the appearance. Also, manufacturers' instructions on the containers of vegetables, especially dehydrated, should be explicitly followed. Variety in preparation in vegetables, such as frying, should be done properly, or the result will not be worth the effort. Emphasis is on preparation in small quantities. Seasoning is more important in cooking vegetables than any other food, since they are more bland than most foods. Seasoning is also important in restricted diets. Another way to increase palatability is to use sauces or to change the form, such as cubing, dicing, or slicing.

PERSONNEL JOURNAL

Vol. 33, April, 1955

* Developing leadership status among supervisors. E. E. Jennings.—p. 406.

* Work sheet helps supervisors talk constructively with employees. J. J. Grela.—p. 417.

Leadership among Supervisors. The "forced leadership training" method is used in training supervisors for leadership. The method consists of taking a group of twenty trainees, developing a human relations case study, and before inviting solutions divide the trainees at random into sub-groups of four or five each. Within a given time each sub-group is to work out a solution. No one is designated leader for any of the sub-groups, although one person in each group usually makes an attempt to get things started and guide the group's thinking. This same person usually presents the solution before the whole assembly. In a second session, the same procedure is used on another problem in human relations. The "leaders" of the first session are put into one sub-group, and the remaining people divided at random again into groups. This is repeated in a third session, thus affording each "non-leader" a chance to guide his group toward a solution until not more than two or three non-leaders remain. It was found that the sub-groups with two leaders worked best. An evaluation of the "leaders" by the participants in the program indicated that a "spreading" of leadership qualities had been achieved by this technique.

Work Sheet in Employee Relations. An "Interview Work Sheet" helps supervisors talk to employees about their faults or weaknesses. Although pointing out to an employee his weaknesses helps him, because it shows him clearly the directions in which he needs to improve, it is a difficult job and often there is the danger of giving the interview the wrong "tone" and doing more harm than good. Many managers feel the need for help in handling these interviews more effectively, particularly in three areas: (a) counseling after performance rating, (b) helping an employee see himself more clearly so that he may reach his full potential, and (c) disciplining. This journal has constructed an "Interview Work Sheet" to aid in such interviews. The sheet is shown in full, together with a sample interview. This sheet can serve both as an interview guide and a record for reference when the employee does not respond to an interview and continues to be a problem. The form has been used successfully in solving problems in institutions.

RESTAURANT MANAGEMENT

Vol. 76, March, 1955

* Prime cost—a better menu price measure. H. H. Pope.—p. 36.

Sorry . . . but you're not covered. W. McCall.—p. 50.

Vol. 76, April, 1955

* Why you keep on losing satisfied customers. C. V. Gallaher.—p. 54.

* How a professional survey improved a typical lunch counter's profits. C. V. Kane.—p. 58.

Salad types for more varied menus. M. L. Casteen. p. 64.

Prime Cost in Menu Pricing. The traditional system of menu pricing based on food cost has proved unsatisfactory, especially since labor cost has become such an important expense item. Methods of factory cost accounting can be used to apply labor costs and overhead expenses to each menu item, but many food service operators find this method too complicated. What is needed is a simple basis for menu pricing that will take labor as well as food into account. Most expenses tend to remain the same from day to day in proportion to the number of meals served, so it is possible to figure a valid price basis by considering only the two main variable costs: food and direct production labor. If an operator adds the cost of preparation and ingredients of a menu item, he will establish his "prime cost." This is a valid and logical basis for menu pricing. Food cost should determine storage and handling expenses; preparation cost should include fringe benefits, such as employee meals, Social Security, unemployment compensation, uniforms, vacations, and so on. Taking preparation time of a menu item may be long and tedious; however, it is worth the effort. If a restaurant should adopt the prime cost system, it is probable that lower prices would be indicated for items with little or no labor cost, such as milk, bread, rolls, and pastry. High prime cost would be found in fresh vegetables, fancy salads, and other foods requiring several production steps, and these prices may need to be raised. In finding a prime cost for items, it is usually easy to learn how to cut costs accurately and easily.

Why You Lose *Satisfied* Customers. Is the food operator to blame for losing satisfied customers? No, for statistics show that the typical trading area turns over 65 per cent in five years' time. However, effort should be made to keep satisfied customers, such as having good food, fair prices, pleasant atmosphere, and courteous employee attitudes to guests. Most of the "lost" customers have simply moved out of the area of the

Instant Starlac

so many uses . . . in so many diets

Retaining all the flavor of fresh milk, Borden's new Instant Starlac, a powdered instantaneously soluble form of non-fat milk, often aids in the solution of dietary dilemmas when protein is required but fat intake restricted. Thus, skim milk is well suited for the peptic ulcer patient who is obese or cannot tolerate fats . . . for patients with ulcerative colitis and concomitant steatorrhea . . . as well as those with regional enteritis.

Because it dissolves so readily, Borden's Instant Starlac can be easily reconstituted to yield a highly palatable beverage, suitable not only for the management of the acutely ill who require tube feeding, but also for the building and maintaining of good nutritional status throughout life.

Readily available, easily stored, and supplied in "quart-envelopes," Borden's Instant Starlac furnishes the protein protection so important in pregnancy . . . in sustaining the capacity to produce antibodies and resist infections . . . so important during postoperative convalescence and recovery from tuberculosis . . . and so necessary both for the "teenager" during the period of rapid growth and heightened emotional stress, and for the older person prone to hypoproteinemia and osteoporosis.

Borden's Instant Starlac dissolves so readily that it can be easily added to soups, beverages, and liquid whole or non-fat milk. Economical, flavorful, highly nourishing, Borden's Instant Starlac is equally simple to use in the hospital kitchen and in home cooking.

Bibliography available on request.

Manufacturers and distributors of BORDEN'S Instant Coffee • STARLAC non-fat dry milk • BORDEN'S Fluid Skimmed Milk • BORDEN'S Evaporated Milk • Fresh Milk • Ice Cream • Cheese • EAGLE BRAND Sweetened Condensed Milk • BREMIL powdered infant food • MULL-SOY hypoallergenic food • BIOLAC infant food • DRYCO infant food • KLIM powdered whole milk

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Special Offer

A complimentary professional supply of the new Borden's Instant Starlac and literature will be sent you if you mail this coupon to

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SAVE EXTRA OPERATION AND EQUIPMENT

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BLAKESLEE
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DISHWASHERS • GLASSWASHERS
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A built-in pre-wash on these Blakeslee Model EC4 Dishwashers subjects the dishes and glasses to a pre-wash just before the pumped wash and final sanitizing rinse. Write for detailed information on the right size to fit your specific requirements.

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restaurant. Emphasis should, therefore, be on getting "replacements" (new customers) through advertising. It must be assumed that a large percentage, or 13 per cent every year, of customers are lost through "causes of geography"—moving away. In considering customer good will, the food service operator should evaluate his ideas in terms of customer replacement.

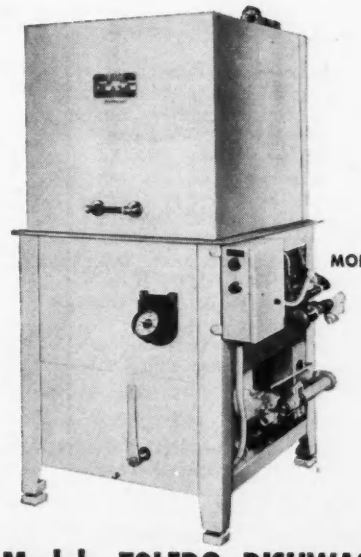
Improving a Lunch Counter's Profits. A typical lunch counter in a small city had a large volume of business, but lost money. To find the cause of the loss, a survey was taken. It was learned that, in the first place, the business had too much volume—84 per cent of it during only 10 hr. of its 17 hr. of operation. At the same time 37 per cent of the payroll applied to the slow hours of business. For several hours a day, the restaurant was merely trading dollars—selling food at no profit. In this case study, more efficient ways of operating came to light. Necessary techniques such as portion control were ignored. Sandwiches that would justify a 65-cent price were sold at 40 cents. The menu items were changed with the more popular ones being emphasized and those which did not bring in a profit were discontinued. Although many customers were lost, new ones took their place, and the operator now makes a profit.

WHAT'S NEW IN HOME ECONOMICS

Vol. 19, April, 1955
Flavour and spice mighty nice.—p. 20.
Foods affect your life.—p. 22.
• Breakfast is important! M. E. Lowenberg.—p. 23.

Breakfast Is Important. Although the human body cannot operate efficiently for 18 hr. without food, going without food for this length of time is quite common to hundreds of office workers, students, and homemakers—"no-breakfast-eaters." Experiments have shown that: (a) subjects who eat breakfast are more alert mentally and can work more efficiently than those who don't; (b) both young and old react similarly; (c) men, more than women, complain of hunger, dizziness, and nausea when they don't eat breakfast; and (d) in one experiment a moderate, basic breakfast gave more satisfactory results than a heavy breakfast. Experimenters found that people enjoyed breakfast more, and also ate more for breakfast, on Sunday than on any other day of the week. This fact is probably due to either a more relaxing atmosphere on that day, or the added time and attention that is given to the preparation of breakfast. Breakfasts should contain good protein and necessary minerals and vitamins, as well as calories. It is wise to follow a menu pattern and give as much attention to the planning of breakfast as to other meals. Children often do not like the conventional breakfast foods, and if this is the case, they should be allowed to eat what they want, such as hamburgers or grilled cheese sandwiches, rather than nothing.

Get Your Choice in TOLEDO® KITCHEN MACHINES



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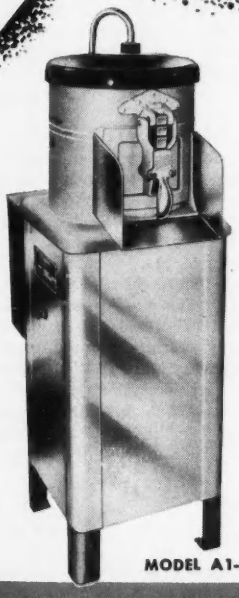
24 Models TOLEDO DISHWASHERS

Door Type . . . manual or timed automatic . . . average capacities to 1250 dishes per hour.

Single Tank Conveyor . . . average capacities 5075 dishes per hour.

Two Tank Conveyor . . . average capacities to 12,600 dishes per hour.

Combination with Conveyor Pre-Wash . . . two or three tank . . . provides pre-wash, wash and rinse in one continuous operation . . . average to 12,600 dishes per hour.



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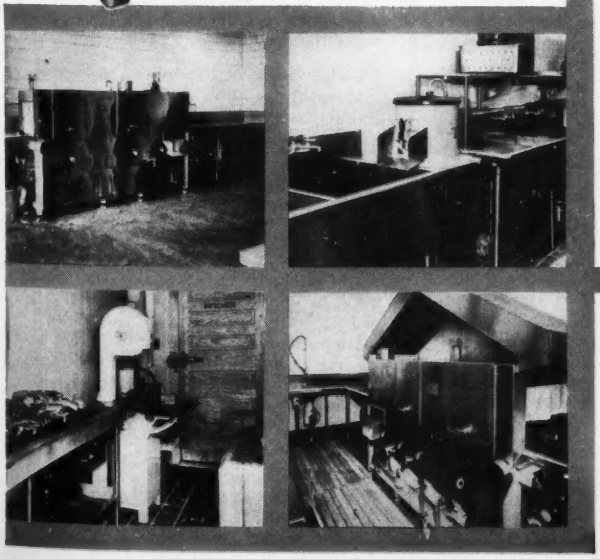
10 Models TOLEDO DOUBLE-ACTION PEELERS

. . . to 70 lb. capacity

Sharp abrasive on both disc and cylinder insures complete "skin deep" peeling with minimum waste. Built-in peel trap separates peelings from water. Exceptionally easy to clean. Disc lifts out. Full rated capacity is peeled in 1 to 1¼ minutes. Also available with automatic Peel Disposer.



9 Models TOLEDO DISPOSERS

with REVERSO-CLEAN ACTION

Helps you cut kitchen costs by fast, easy, sanitary disposal of food waste. Eliminates tedious, obsolete handling of garbage pails . . . food waste is shredded and flushed down the drain. "Reverso-Clean" feature gives self-cleaning action. Continuous feed, high capacity. Models with 15, 18 and 20 inch cones with scraping blocks or silverware guards; also for 3½" to 4" sink openings.

Write for catalog No. 3815

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Briefs on the 38th Annual Meeting

St. Louis—October, 18-21, 1955

LACLEDE'S VILLAGE GROWS UP

St. Louis, the second permanent settlement to be established in Missouri (the first was Ste. Genevieve, 1735), was intended to be merely a fur trading post.

A merchant of New Orleans obtained from the French governor of Louisiana a grant giving him the exclusive right to trade with the Indians in the Missouri River area for a period of eight years. His partner, Pierre Laclede Liguest, was placed in charge of the enterprise. Construction of houses was begun February 14, 1764.

From an eight-year grant for a trading post has grown the nation's eighth largest city.

UNDER THREE FLAGS

France had secretly ceded a large part of the Louisiana Territory to Spain in 1762, but it was 1770 before the Spanish government of Upper Louisiana came to St. Louis to take charge.

After thirty years under Spanish rule, the residents of the village suddenly discovered that the territory has been returned to France in 1800 and that they were again Frenchmen. But, since France had not officially reclaimed the area, the Spanish flag continued to fly from the fort outside St. Louis.

Through the Louisiana Purchase, effected during Thomas Jefferson's administration, in 1803, the area as far west as the Rockies became a territory of the United States.

On March 9, 1804, an American Army officer, acting under the orders of the French governor general of Louisiana in New Orleans, received from the Spanish governor at St. Louis the Upper Louisiana territory for the government of Franche. This ceremony was followed on the same day by the transfer of the region to the United States.

Thus, in a single day, the flag of Spain flew over the French village, the flag of France was hoisted to the top of the mast for a brief moment, to be replaced permanently by the stars and stripes.

WESTERN INITIATIVE REVEALED

The "Show Me" State has demonstrated its progressive spirit since its adolescence.

The Lewis and Clark Expedition started from St. Louis on May 14, 1804, taking the route up the Missouri River to its sources in present-day Montana; across the Bitter Root Mountains into Idaho; and by way of a series of rivers, to the Pacific Ocean.

A Missourian, William Becknell, was the father of the Santa Fe Trail. He was the first to take a successful trading expedition to Santa Fe, in 1821.

Just three years after Samuel Morse invented the telegraph, a forerunner of the telephone was installed in residences of St. Louis. It was comprised of a call box with an attached lever. A message was sent by setting the lever in a certain way. The clicks that sounded at the other end of the wire could be read by means of a code. Only seven different messages could be sent—one of them, a call for a doctor.

The first stage coaches to carry mail to California were initiated by John Butterfield of St. Louis. A few years later they were followed by the Pony Express, which employed as a rider, famed "Buffalo Bill."

EARLY PLANS FOR BEAUTY AND CULTURE

The first steamboat to ply the Mississippi was launched in 1811. Eight years later, one of the passengers debarking at St. Louis from the *Maid of Orleans* was an Englishman, Henry Shaw. He came with a stock of hardware and set up business in one small room where he slept and prepared his own meals.

Years later, in 1858, he gave to the city 75 acres of trees and plants, the largest collection of plant life in the western hemisphere. Shaw's Garden, modeled after the famous Kew Gardens of England, has greenhouses which shelter flora which Mr. Shaw collected on his travels over the world.

Not far distant is Forest Park, cover-1380 acres, which is the second largest park in any American city. Located here are the famous zoo, which accommodates 2000 creatures, and which stages the enormously popular animal shows; the Jefferson Memorial; the Jewel Box which offers a new display of plants and flowers each month; and the Art Museum which maintains one of the best collections of Chinese bronze, ceramics, and paintings.

The first university west of the Mississippi, St. Louis University, was founded as St. Louis Academy in 1818. It was followed in 1853 by Eliot Seminary which later became Washington University.

ALUMNAE MEALS

The Alumnae Meals Committee will be pleased to arrange for mealtime reunions of college alumnae and dietetic internship groups. The reunions are scheduled as follows:

Tuesday evening, October 18—college alumnae
Wednesday breakfast, October 20—dietetic internships
Thursday evening, October 20—dietetic internships
Friday breakfast, October 21—college alumnae

The Committee urges that plans be made immediately so that reservations may be confirmed. The name of the group, its chairman, and the approximate number expected should be sent to: Henrietta Becker, Director of Dietetics, Barnes Hospital, 600 South Kingshighway Boulevard, St. Louis 10.

No reservations will be accepted after September 10.

Watch this page each month for Annual Meeting news.

What the Annual Meeting Means to Me

The Annual Meeting means *progress* to me . . . personal as well as professional.

In the restaurant business we must keep abreast of the times—both in food trends and operating methods. The meeting provides this opportunity. Programs are informative and stimulating; exhibits, extensive and educational. Nowhere can one find so much pertinent information concentrated in one spot.

For my business, I cannot afford to miss it.

Margaret L. Mitchell
Vice President—Food Production
Stouffer Corporation, Cleveland

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The Annual Meeting to me is the combination of all that makes our professional life worth while. It means that names become real people, and words and ideas come alive as presented by speakers or obtained in discussion with other dietitians. Visiting again with old friends, making new friends, looking at exhibits, learning the latest in research—all these give inspiration and stimulation and help to recharge my mental batteries for another year's work.

E. Neige Todhunter, Ph.D., Dean
School of Home Economics
University of Alabama, Tuscaloosa

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Public health nutritionists, with whom I work and who are associated with twelve of the state health departments in the Middle West, are keenly interested in keeping up to date on current nutrition research and educational techniques. One way of doing this is through professional meetings. These nutritionists place high priority on attending the A.D.A. Annual Meeting. Personally, I feel that this is the most worthwhile meeting of the year.

Mary Reeves
Nutrition Consultant
Children's Bureau
Chicago

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What hospital dietitian can afford *not* to attend the Annual Meeting? I hear new ideas in therapeutic dietetics; see new foods and new equipment; talk with experts in my field. Each year I come away with a fresh outlook and renewed enthusiasm.

Cora E. Kusner
Director, Department of Dietetics
Colorado State Hospital
Pueblo

Application for Housing Accommodations

THE AMERICAN DIETETIC ASSOCIATION

St. Louis, Mo. • October 18–21, 1955

For your convenience in making hotel reservations for the coming meeting of THE AMERICAN DIETETIC ASSOCIATION on October 18–21, 1955 in St. Louis, hotels and their rates are listed below. Use the form at the bottom of this page, indicating your first, second and third choice. Because of the limited number of single rooms available, you will stand a much better chance of securing accommodations of your choice if your request calls for rooms to be occupied by two or more persons. All reservations must be cleared through the Housing Bureau. ALL REQUESTS FOR RESERVATIONS MUST GIVE DEFINITE DATE AND HOUR OF ARRIVAL AS WELL AS DEFINITE DATE AND APPROXIMATE HOUR OF DEPARTURE, ALSO NAMES AND ADDRESSES OF ALL PERSONS WHO WILL OCCUPY RESERVATIONS REQUESTED *MUST* BE INCLUDED.

Hotel	For one person	For two persons		2-Room Suites
		Double Bed	Twin Beds	Parlor & Bedroom
JEFFERSON*	6.00– 9.00	9.00–12.00	11.00–15.50	25.00–39.50
LENNOX	5.00–10.00	6.50–10.50	10.00–12.50	18.00 & Up
MARK TWAIN	4.00– 7.50	5.50– 9.00	8.00– 9.00	12.50 & Up
MAYFAIR	5.00–10.00	6.50–12.00	8.50–12.00	14.50 & Up
STATLER	5.00–11.00	7.50–14.00	9.00–18.00	30.50–32.00

In the event that the hotel room rate structure is changed prior to the above convention these rates will be changed accordingly.

(See map on page 530—May issue)

* Headquarters

ALL RESERVATIONS MUST BE RECEIVED PRIOR TO: September 18, 1955

Hotels Convention Reservation Bureau, A.D.A.
Room 406—911 Locust St.
St. Louis 1, Mo.

Please reserve the following accommodations for: THE AMERICAN DIETETIC ASSOCIATION Convention in St. Louis, Missouri on October 18–21, 1955

Single Room ..... Double Bedded Room ..... Twin Bedded Room .....
2 Room Suite ..... Other Type of Room .....
Rate: From $..... to $.....

First Choice Hotel .....
Second Choice Hotel .....
Third Choice Hotel .....

Arriving at Hotel (date) ..... hour ..... A. M. ..... P. M. Leaving (date) ..... hour ..... A. M. ..... P. M.

THE NAME OF EACH HOTEL GUEST MUST BE LISTED. Therefore, please include the names of *both* persons for *each* double room or twin bedded room requested. Names and addresses of all persons for whom you are requesting reservations and who will occupy the rooms asked for:

.....
.....
.....
.....

(Individual Requesting Reservations)
Name .....

Address .....

City and State .....

If the hotels of your choice are unable to accept your reservation the Hotels Convention Reservation Bureau will make as good a reservation as possible elsewhere provided all hotel rooms available have not already been taken.

News Notes

A.D.A. Representative. Mary Reeves, A.D.A. Speaker of the House of Delegates, has accepted an appointment to be the Association's representative to the American Committee on Maternal Welfare, Inc., for a three-year term.

Milk and dairy products are to be the *featured* plentiful foods during June. The entire list released by the U.S.D.A. follows:

Protein foods

Beef
Chickens—broilers and fryers
Frozen fish fillets
Halibut
Milk and other dairy products
Tuna—canned

Other foods

Grapefruit—fresh and processed
Lard
Lemons—fresh and processed
Oranges—fresh and processed
Prunes—small size
Raisins
Rice
Vegetable fats and oils

Tri-State Hospital Assembly. May 2 through 5 were the dates of the annual Tri-State Hospital Assembly held in Chicago. For this meeting, dietitians of Illinois, Indiana, Wisconsin, and Michigan presented two programs, under the chairmanship of Margaret King, Director of Dietetics, Henry Ford Hospital, Detroit. The first was a panel discussion on "Hospital Food Management," for which Fern W. Gleiser, A.D.A. President, served as moderator. Panelists and their topics were:

"Who Should Run the Hospital Food Service?"—Ronald Yaw, Director, Blodgett Memorial Hospital, Grand Rapids

"What Are the Responsibilities of a Food Service Manager?"—William DeHaan, Food Service Manager, Blodgett Memorial Hospital, Grand Rapids

"What Are the Responsibilities of the Hospital Dietitian?"—Louise Wilkonson, Director, Dietary Department, Michael Reese Hospital, Chicago

"What Can the Purchasing Agent Do for the Dietary Department?"—Martin Mix, Purchasing Agent, Henry Ford Hospital, Detroit

"What Does the Hospital Field Expect from the Dietitian?"—George E. Cartmill, Director, Harper Hospital, Detroit

The second program of the Conference on Dietetic Service was a discussion led by Beulah Hunzicker, Director, Department of Dietetics, Presbyterian Hospital, Chicago. Subjects considered by the participants were:

"What Can We Do about Shortages?"—Myrtle VanHorne, Consultant Dietitian, Michigan Department of Health, and Lee Yothers, Administrator, Ferguson-Droste-Ferguson Hospital, Grand Rapids

"How Can We Evaluate Our Own Food Service Units?"—Mary M. Harrington, Assistant Director and Director of Dietetics, Harper Hospital, Detroit

"Could a Shared Dietitian Help You?"—Betty Hoover, Dietitian, Rush Memorial Hospital, Rushville, Indiana; and John E. Meek, President, Board of Trustees, Rush Memorial Hospital

Army News. From May 16 through 21, the Army's Women's Medical Specialist Corps conducted the first Annual Institute for selected officers at Walter Reed Army Medical Service Graduate School, Washington, D. C. The purpose of the Institute was to provide an opportunity for Regular and Reserve Army officers to develop increased skill in administration and personnel management; to broaden their knowledge of Army policies, procedures, and regulations pertaining to the Corps; and to discuss current professional trends. The sessions directed to professional trends were conducted in three sections, each led by the chief of the section of the Corps assigned to the Office of the Surgeon General. Civilian consultants also participated in the programs on current trends. Alta B. Atkinson, Manager of Food Service, Columbia University, spoke on "The Dietitian as an Executive." Twelve officers from each of the professional sections of the WMSC attended. Capt. Rosamond Hughes, Food Service Division, Walter Reed Army Hospital, served as course director.

The Army has also announced the promotion of three dietitians to the rank of major. This is the first promotion list to major in two years. Those selected are: Major Mary Lipscomb, Director, Army Dietetic Internship, Brooke Army Hospital, Ft. Sam Houston, Texas; Major Josephine C. Lydon, Chief, Food Service Division, Fifth General Hospital, Stuttgart, Germany; and Major Evelyn G. Summers, Chief, Food Service Division, U. S. Army Hospital, Ft. Knox, Kentucky.

Nutrition Institute. From June 14 to 16, the 16th annual New York State Nutrition Institute will be held at the University of Buffalo. The Institute will be sponsored by the University of Buffalo, the Nutrition Committee of the Council of Social Agencies of Buffalo and Erie County, and the New York State Nutrition Committee. Subjects to be discussed will include: "Our Changing Food Habits," "The Effect of Under- and Over-Nutrition in Diseases," "What Nutrition Committees Are Doing," "Nutrition Education," and "What's New in Food Processing?"

Canadian Dietetic Association. The 20th Annual Convention of the Canadian Dietetic Association will be held in Toronto, June 27 to 29. Features of the program will include:

"Vitamin Research"—Dr. Gladys A. Emerson, Merck Institute, Rahway, New Jersey

"Vitamin B_6"—Dr. E. W. McHenry, Professor of Nutrition, University of Toronto

"Mental Health"—Dr. Reva Gerstein, Director of Program Planning, Canadian Mental Health Association, Toronto

"Purchasing"—Professor Katherine Hart, Michigan State College, East Lansing

"Highlights in Meat and Nutrition"—Rita Campbell, National Live Stock and Meat Board, Chicago

Summer Course in Food Technology. Massachusetts Institute of Technology, Cambridge, will again offer a three-week summer program on food technology, June 20 through July 8. After one week of general lectures on food origin and composition, handling, transportation, storage, and control, students will choose one of five areas for specialized study during part of the next two weeks. The special studies will be in: sanitation, nutritional evaluation of food processing, food acceptance and flavor evaluation, radiation sterilization, and food engineering.

Awards. *Dr. Charles Glen King,* Scientific Director, The Nutrition Foundation, Inc., has been selected as the 1955 Appert Award medalist by the Institute of Food Technologists. The award will be presented during the 15th annual meeting of the Institute in Columbus, Ohio, June 12 to 16. The award is made annually by the Chicago Section of the Institute to an eminent scientist for contributions to the field of food technology. It commemorates the work of Nicolas Appert, "father of the world's canning and bottling business." Dr. King is currently serving as the Chairman of the A.D.A. Advisory Board.

Dr. E. V. McCollum, Professor Emeritus of Biochemistry, Johns Hopkins University, was recently named the recipient of the 1955 Osborne and Mendel Award "in recognition of his outstanding discoveries concerning vitamins and mineral nutrients, and his numerous other distinguished contributions to the science of nutrition." The Award, established by The Nutrition Foundation, Inc., is conferred by the American Institute of Nutrition. With the Award goes an honorarium of $1000. Dr. McCol-

When your geriatric patient turns his back on food . . .

chances are his menus lack the variety and appetite appeal that make for mealtime enjoyment. Gerber can help you here. For Gerber offers a wide variety of Strained and Junior (minced) Foods to give you greater prescription selectivity—make substitutions for "finicky" eaters possible. 4 cereals, over 60 fruits, vegetables, meats, soups, desserts, processed to preserve true flavors, appealing colors, a high degree of wholesome food values.

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Added encouragement to eating—Gerber's "Special Diet Recipes"—easy-to-prepare dishes, properly indexed for Bland, Soft, Mechanically Soft, Liquid and Low-Residue diets. For free copies, write, on your letterhead, to Dept. 236-5, Fremont, Michigan.

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lum is one of five honorary members of A.D.A.

A.D.A. Treasurer Honored. The Colorado chapter of Altrusa International recently elected as its new President, Doris Odle, Chief Dietitian, University of Colorado Department of Medicine (Colorado General Hospital), Denver. Miss Odle is also currently serving as A.D.A. Treasurer.

Dietitians Receive *Institutions* Awards. When the awards for the *Institutions* Magazine annual food service contest were announced on May 9 at the National Restaurant Association convention, several dietitians were named as winners:

Merit Awards went to:
- Friley Hall, Iowa State College, Ames, Iowa—Doris June Hittle, Manager
- Mt. Sinai Hospital, Cleveland—Florence Levy, Director, Dietetic Department
- Porterville State Hospital, Porterville, California—Sally Cummings, Food Administrator

Honor Award recipients included:
- Daniel Freeman Memorial Hospital, Inglewood, California—Patricia Riesner, Head Dietitian
- New England Deaconess Hospital, Boston—Effie May Winger, Chief Dietitian

The panel of judges for this year's competition included representatives from the restaurant and hotel fields, dietetics, and the equipment industry. Millie Kalsem, Chief Executive Dietitian, Cook County Hospital, Chicago, served as the dietetic specialist among the judges. Pre-analysis of the entries, to aid in accurate judging of all material, was done by a group of six widely known specialists, including Dr. Mary deGarmo Bryan, Chicago.

HELP for Busy Kitchens . . .
BETTER Food at Lower Cost
the *Steamcraft* Way!

A Steamcraft cooker is time-saving, fuel-saving, labor-saving and money-saving. It brings the advantages and economies of cooking with steam into any kitchen, large or small. Steamcraft cooks vegetables, chickens, frankfurters, turkeys, hams, fish, with steam for better flavor. Frequent small-lot cooking is possible because of Steamcraft's fast cooking action. Cooking starts instantly with the penetrating heat of steam. Foods retain their natural flavor, color and nutrients—shrinkage of meat is held to a minimum.

Floor-type Steamcraft has two compartments. One or two-compartment models available for floor, counter or table use. Gas, electric or steam operation.

In addition, Steamcraft heats canned foods, blanches, restores frozen foods, reheats cooked food, scalds milk, pre-cooks for deep frying or roasting.

For full details on how Steamcraft steam cooking can help you capitalize on "Big Kitchen" advantages, write for "15 Reasons for Choosing Steamcraft."

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"The Steamer People"
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Alice Biester Retires. After forty years of teaching and research, Alice Biester, Professor of Nutrition, University of Minnesota, will retire this month. In her research capacity, Miss Biester has participated in investigations dealing with the nutritive value of foods, the relative sweetness of sugars, blood regeneration in hemorrhagic anemia, and the nutritional status of older women. Since the first curriculum for dietetic majors was established at the University in 1918, she has also had an important part in preparing nearly six hundred women for careers in dietetics. She has served as Chairman of A.D.A.'s Professional Education Section, Chairman of the A.H.E.A.'s Food and Nutrition Division, and President of Omicron Nu, the Minnesota Dietetic Association, and the Minnesota Nutrition Council.

Research Assistantships. Several new research assistantships have recently been established in the Department of Food and Nutrition, Florida State University, Tallahassee. The positions, which are financed by several government agencies and food industries, will provide funds for research on: radiation sterilization of foods, preservation of oysters and other sea foods, development of new types of prepared frozen oyster products, meat pigments, fat rancidity, microbiologic and photometric vitamin assays. Qualified graduates in dietetics, food technology, or nutrition wishing to work toward higher degrees will be eligible. The research may be used for thesis or dissertation. The assistantships carry stipends ranging from $1200 to $1600 and tuition, for one-third to half-time work.

Special Nutrition Issue. In March 1955, *Postgraduate Medicine* published a special issue devoted entirely to "Nutrition and Disease." The issue was prepared under the guest editorship of Dr. Tom D. Spies, Department of Nutrition and Metabolism, Northwestern University Medical School, Chicago, and the Nutrition Clinic, Hillman Hospital, Birmingham, Alabama. Almost fifty case histories of patients with nutritional diseases and deficiencies of various types are presented in this special issue, which is generously illustrated with four-color photographs, graphs of progress, and drawings.

Government Publications. *Food Consumption of Urban Families in the United States* is the most recent release of the U.S.D.A.'s Home Economics Research Branch. This bulletin presents the results of surveys made in 1948-49 in which approximately 4500 schedules

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were furnished by households on their food consumption for a week and on certain family characteristics. Survey areas included four cities: Birmingham; Buffalo; Minneapolis-St. Paul; and San Francisco. The bulletin reports expenditures for food; quantities of food consumed; relationship of food consumption to family income, size, and other family characteristics; and regional variations in food consumption. Included also is a comparison of the findings with those of a similar survey made in 1942. Preliminary reports in processed form of these surveys have been released earlier, and in some instances contain more detailed information on some phases of the study. A list of these preliminary reports is included in an appendix. This 203-page report, labeled Agriculture Information Bulletin No. 132, is available from the Government Printing Office for $1 a copy.

Another recent publication of the Human Nutrition Research Branch, U.S.D.A., is a revision of *Money-Saving Main Dishes*. This forty-eight-page booklet, which is Home and Garden Booklet No. 43, contains more than a hundred recipes to help the homemaker prepare budget-wise meals. Recipes are categorized according to meat, fish, eggs, and so on. Special features include a tabular listing of amount of a number of foods which provide about ½ oz. protein, as well as ideas for lunchbox main dishes, salads, and relishes. Copies are on sale by the Government Printing Office for 20 cents each.

The proceedings of a symposium on *Methods for Evaluation of Nutritional Adequacy and Status* are available on request from the Quartermaster Food and Container Institute for the Armed Forces, 1819 West Pershing Road, Chicago 9. The symposium, held in February 1954, was sponsored by the Institute and the Medical Nutrition Laboratory, Office of the Surgeon General, U.S. Army. Outstanding authorities participated in the symposium, such as H. H. Mitchell, University of Illinois; Paul R. Cannon, University of Chicago; William J. Darby, Vanderbilt University School of Medicine; Esmond E. Snell, University of Texas; D. Mark Hegsted, Harvard School of Public Health; L. A. Maynard, Cornell University; W. H. Sebrell, Jr., and J. M. Hundley, National Institutes of Health; and Norman Jolliffe, New York City Department of Health. The contents of this report include sections on: food stability, nutrition aspects of rations, and food acceptance. Papers published in this report are complete with tabular data and bibliographies to make the material more valuable.

Nutrition Education Program Described. *Research in Action—Nutrition Education, The Second Year* is the title of an interim report on the nutrition education research project being conducted in Kansas City, Missouri public schools by Drs. Pattric Ruth O'Keefe and Floy Eugenia Whitehead, co-directors of the project. The report presents the purpose and design of the program, the work of the investigators, the activities conducted in various schools, and a comparison of the food habits of the children before the study was started and at the end of the second school year. The project is to be continued for a third year. Copies of this report may be obtained from the Director, Department of Health and Physical Education, Kansas City Public Schools, Kansas City, Missouri.

Vegetable Chips. French-fried vegetable chips and "nuggets" are new, tasty snack foods which have been developed by the U.S.D.A.'s Eastern Utilization Research Branch, Wyndmoor, Pennsylvania. Chips from sliced carrots, beets, and parsnips, and nuggets from whole peas and Lima beans are fried in deep fat in much the same way that potato chips are prepared. The chips have the characteristic flavor of the vegetable, enhanced by deep frying. The nuggets have their own special, nut-like flavor. The chips may be seasoned with ordinary salt, garlic, celery, bacon-flavored powder, or parsley salt. Special flavors result by frying longer than usual, i.e., long frying of Lima bean nuggets gives a toasted almond flavor.

In addition, the Lima-bean and pea nuggets can be ground into soup powders that reconstitute quickly in hot water. Mixed with hickory-smoked protein (yeast) powder, already available commercially, ground pea nuggets may be made into a packaged soup mix

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comparable to old-fashioned ham and pea soup. This may prove a successful way to use large-size, very mature peas.

The French-fried Lima beans and peas may also be pressed into bars for possible use as a convenient quick-energy food in military rations.

Storage tests indicate that these chips and nuggets keep well for six to twelve months or more at room temperature if fried in oil of high stability. The carrot chips are somewhat less stable than the other products because of their high carotene content.

Chilled Orange Juice. During the season this year, more than a million boxes of Florida oranges have been marketed in northern cities as fresh orange juice. New developments have made it possible for the juice to be pressed in Florida and shipped rapidly under refrigeration for sale in paper cartons in the dairy departments of groceries and super-markets. Some processors ship the juice in cartons; others in refrigerated tanks for distributors to put into cartons. Because of the time- and labor-saving this chilled fresh orange juice offers the consumer, the trend seems likely to grow.

Fruit-Juice Concentrates without Refrigeration. Superconcentrated sweetened grape juice and apple juice which can be stored without freezing or refrigeration for at least a year will soon be on the market. The U.S.D.A. held tests where a trained taste panel rated juices which had been stored at 73°F. for a year. It was found that the juices retained the characteristic appetizing flavor of the fresh fruit, with little change in flavor. The excellent flavor and good storage behavior of these superconcentrates is a result of packing them hot—at 180°F.—and then cooling them quickly. The new products are the result of experimental work at the U.S.D.A.'s Eastern Utilization Researc Branch, Wyndmoor, Pennsylvania.

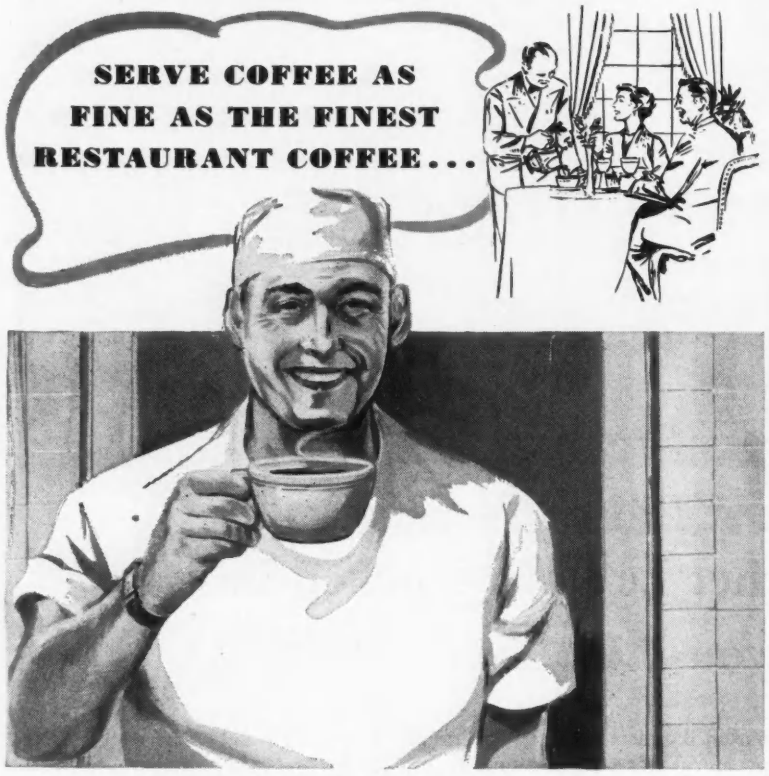
Packaging Frozen Chicken. The need for good packaging was found to increase with the length of time chicken is to be held frozen and to decrease with the storage temperature. Thus for chickens held at −20°F. for only a few weeks a package of semi-moistureproof material was satisfactory. But, when held at 0°F. for six months or longer, a completely moisture-vaporproof package was required. Cut-up chicken presents a difficult problem in packaging, for the package should be formed to the shape of the product to exclude all possible air. Heat-shrunk, moistureproof bags solved one problem, but because the bags were likely to be punctured and were difficult to pile or wrap, they were placed in cartons to facilitate handling and stacking. This amounted to double wrapping.

Better Apple Juice. Apples ripened *off* the tree have been found to give juice of finer flavor than tree-ripened fruit. Juice made one day after picking from Delicious apples gathered in their prime was astringent and lacked flavor in contrast to juice from apples harvested and then ripened. Delicious apples need at least two weeks of ripening after harvest to develop flavor, and if picked before maturity, they may require as long as six weeks. Other apple varieties were best for juice after a week or two following harvest.

Research done cooperatively by the U.S.D.A. and the Washington State Tree Fruit Experiment Station also indicated that a blend of juice containing a large proportion of Delicious apples and a smaller proportion of more tart apples rated high in flavor. Juice from Jonathans and Winesaps not fully ripe may provide the tartness.

Obituaries

Louise Crandall Poley. Word has been received of the death on April 26 of Louise Crandall Poley, Director of Dietetics, Denver General Hospital. Mrs. Poley, who had been in that position for a number of years, had been active in the inaugurating and promoting of a course to train sub-professional food service supervisors in the Denver area. Largely through her efforts, a course was established in the Emily Griffith Opportunity School in Denver for such students. Coordinate with the classroom



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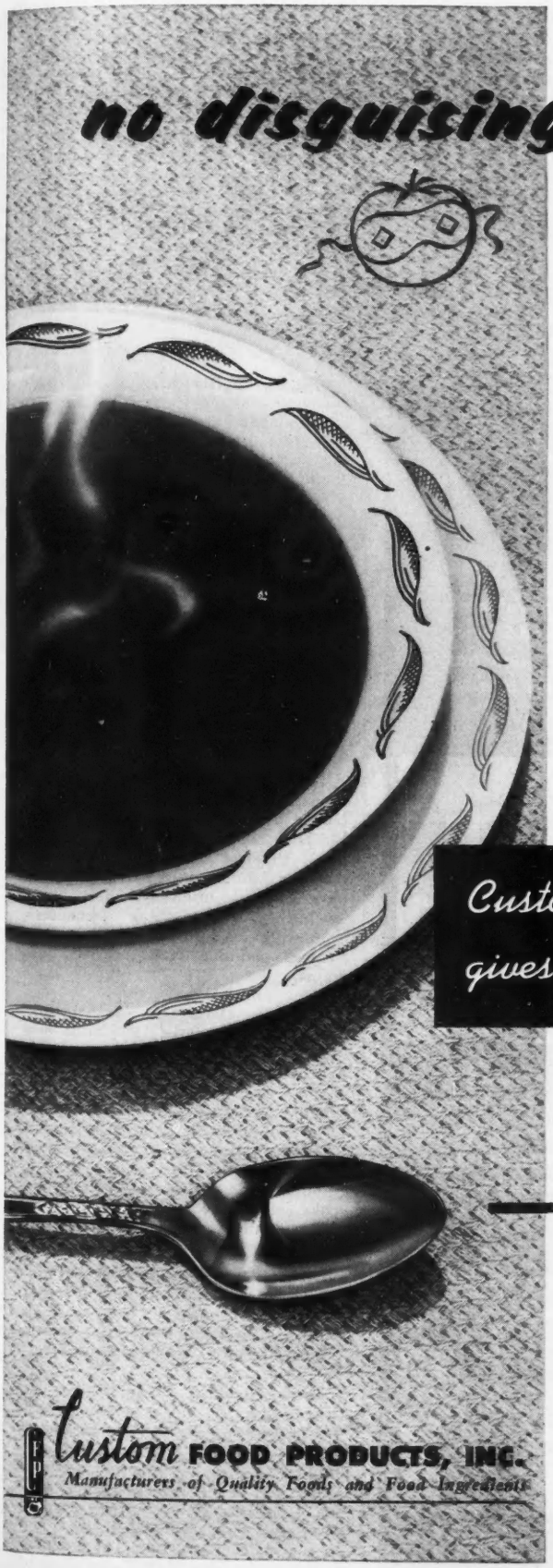

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work, Denver General Hospital worked out a program of planned experience to follow the theoretical training. Mrs. Poley had also held positions at Fitzsimons Hospital, Denver; Prospect Heights Hospital, Brooklyn; Undercliff Sanitorium, Meriden, Connecticut; and Greeley Hospital, Greeley, Colorado. She had been active in professional circles, having served as President of the Colorado Dietetic Association in 1953–54.

Helen Burford Archinal. The A.D.A. office has been notified of the death of Helen Burford Archinal on April 6 at her home in Santa Monica, California. Mrs. Archinal was a life member of the Association. Her most recent position had been on the faculty of the Horace Mann Junior High School, Los Angeles. Other positions which she held during her professional life were with Sutter General Hospital, Sacramento; and Kern General Hospital, Los Angeles.

News of State Associations

California Dietetic Association. The annual spring convention of the California Dietetic Association was held in San Francisco, April 22 and 23. Dr. Agnes Fay Morgan, Professor Emeritus, Home Economics Department, University of California, spoke on "Recent Advances in Nutrition Research Including Nutrition in Stress." Another highlight of the meeting was the presentation of the 1955 scholarship award of the Association to Geraldine Bardy, senior student in dietetics at Mills College, who plans to take an internship next year at Scripps Metabolic Clinic, La Jolla.

Colorado Dietetic Association. Senior students in the home economics departments of Colorado colleges and universities who will accept internships this year were special guests of the Colorado Dietetic Association at a luncheon in May in Denver. Public health nurses also shared the day's meeting with the Association.

Delaware Dietetic Association. In April, Volume 1, Number 1 of the Delaware Dietetic Association's *Diamond State Bulletin* made its bow. The Association's spring meeting was held May 15. Jane Hartman, as representative of A.D.A., was the featured speaker.

Florida Dietetic Association. Dr. Jack Rudolph was guest speaker before the *Miami Dietetic Association* in January. His subject was "Diet and Allergy." Connie Gee, Club Editor of the Miami *Daily News*, spoke on "Professional Women in Important Positions" at the February meeting of the group. During Dental Health Week, the Miami group sponsored an exhibit showing proper diet for good dental health.

Illinois Dietetic Association. Chicago dietitians this year have attended five seminars conducted by Dr. Eleanora Sense, Wesley Memorial Hospital. Planned to help the dietitian teaching student nurses, the seminars have covered: orientation procedures, teaching aids, teaching techniques, evaluating teaching effectiveness, curriculum planning, and inservice programs.

Indiana Dietetic Association. The Indiana Dietetic Association held its winter meeting in Indianapolis on February 15. Dr. A. D. Dennison, cardiologist, was the guest speaker of the evening. He spoke on "Factors *Other Than* Sodium in the Failing Cardiac."

At the spring convention, held in Indianapolis on April 29, Jack A. L. Hahn, Methodist Hospital, Indianapolis, spoke on "What Is Expected of Us." Other featured speakers and their subjects were:

"Parsimonious Dietetic Management"—Bruce McSparrin, Indiana University School of Business

"Shared Dietitian"—Betty Hoover, Rush Memorial Hospital, Rushville

Iowa Dietetic Association. The *Des Moines Dietetic Association*, with the cooperation of the Department of Adult Education of the Des Moines Public Schools, is conducting a second series of two courses in weight control. Sue Huston Green and Mary Macomber, assisted by other members of the group, are serving as instructors. The program, similar to the Iowa State Department of

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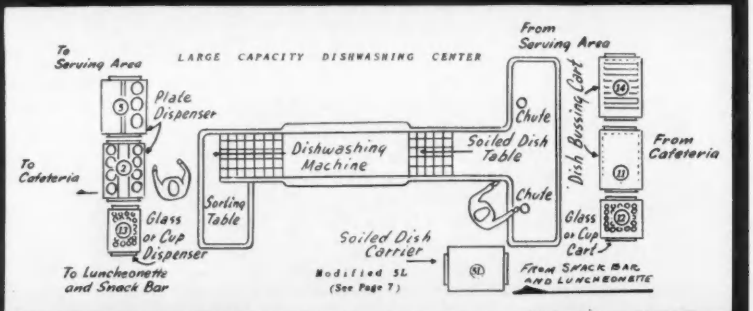

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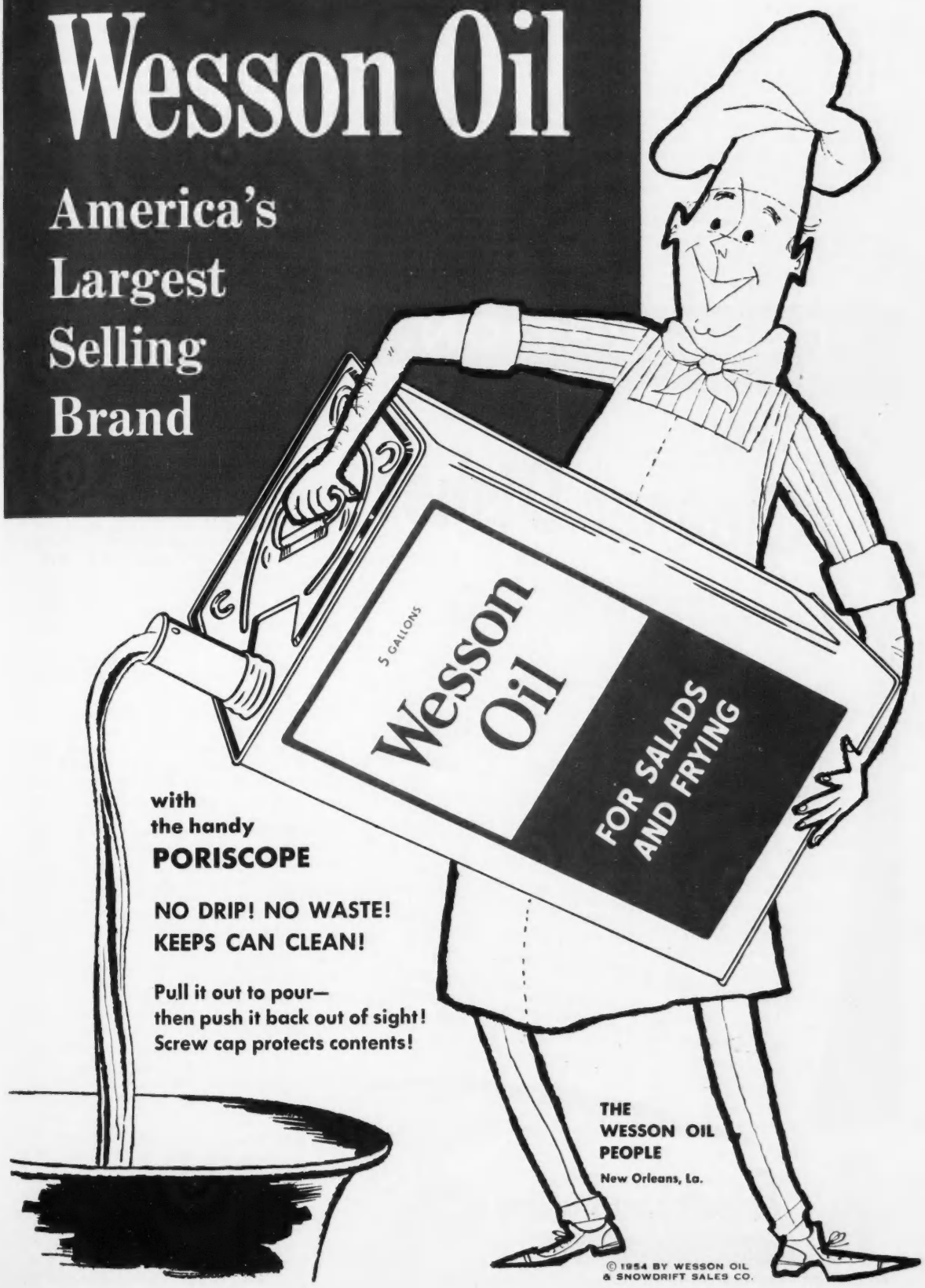

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Public Health group therapy program, is for ten lessons of one hour each week. A nominal fee of $2.25 is charged per person.

Kansas Dietetic Association. The Kansas Dietetic Association has contributed $50 for use by the Kansas Council for Children and Youth.

The *Topeka Dietetic Association* this year has co-sponsored with the Shawnee County Medical Society and the State Department of Vocational Education, two night school classes in "Reducing by Diet." The course emphasized how to lower caloric intake, at the same time improving nutritional status. Class members gained a better understanding of fad diets, drugs, and products that claim to reduce weight. Outside instructors were brought into the program to discuss special aspects of obesity and diet.

Maryland Dietetic Association. At the February meeting of the Maryland Dietetic Association, Dr. Eugene Nelson, Chief, Division of Nutrition, Food and Drug Administration, discussed "Combating Food Misinformation." Dr. Nelson stated that education is the best approach to the problem of food misinformation, since a law curtailing the activities of nutritional "quacks," advertisements, door-to-door salesmen, circulars, and "health" lectures would interfere with our freedom of speech. All adulerated or misbranded food is under the jurisdiction of Dr. Nelson's department.

At the March meeting, diet therapy in epilepsy was discussed. Dr. Samuel Livingston, Associate Professor of Pediatrics, Physician in Charge, Epilepsy Clinic, The Johns Hopkins Hospital, spoke on "The Ketogenic Diet from the Doctor's Point of View," while Mary Lou Gedel, Dietitian in Charge, Food Clinic, The Johns Hopkins Hospital, presented the dietitians' viewpoint.

Missouri Dietetic Association. A joint meeting of the Missouri-Kansas Dietetic Associations was held April 28 and 29 in Kansas City, Missouri. Harry Panhorst, Director, Washington University Clinic, St. Louis, spoke on "Improving Relations through Better Communications" at the opening luncheon. Other speakers and their subjects were:

"Relations between the Hospital and Community"—Dr. Roscoe Pullam, Dean, University of Missouri School of Medicine, Columbia

"Interdepartmental Relationships within the Hospital"—Carl Lamley, Executive Director, Stormont-Vail Hospital, Topeka

"Relationships within the Dietary Department"—Dorothy Vorhies, Director of Dietetics, University of Missouri School of Medicine, Columbia

"Report on Nutrition Study in Kansas City Schools"—Dr. Eugenia Whitehead, National Dairy Council, Chicago

"Food Specifications"—Kathryn Bitters, Dietary Consultant for State Institutions, Kansas Board of Health, Topeka

"Emergency Mass Feeding"—Elsie Fulks, Dietitian, Pennant Cafeteria, Topeka

The *Greater Kansas City Dietetic Association* participated in the "career" program of the Home Economics Association of Greater Kansas City on March 18 at Kansas City University. A hospital dietitian, a medical intern, and two dietetic interns took part in a skit showing opportunities in dietetics. Members of the *Greater Kansas City Association* also conducted the March 1 meeting of the cities' Lay Diabetic Society. The program consisted of films and an open discussion and exhibit on meal planning for persons with diabetes.

New Jersey Dietetic Association. The *Trenton Dietetic Association* was hostess for the spring meeting of the New Jersey Dietetic Association held in Princeton on May 19. Guest speaker of the opening session was Dr. Morgan Upton, Rutgers University, whose topic was "Positive Ways to Guide Human Relations in Food Service Operations." Alta Yazujian, Head Dietitian, Mercer Hospital, Trenton, was moderator of the panel discussion on "Human Relations and the Dietitian."

On April 22, the Professional Education Section of the New Jersey Association sponsored a conference on "Teaching Nutrition and Diet Therapy to Student Nurses" in Newark. The program was the first in a series planned to

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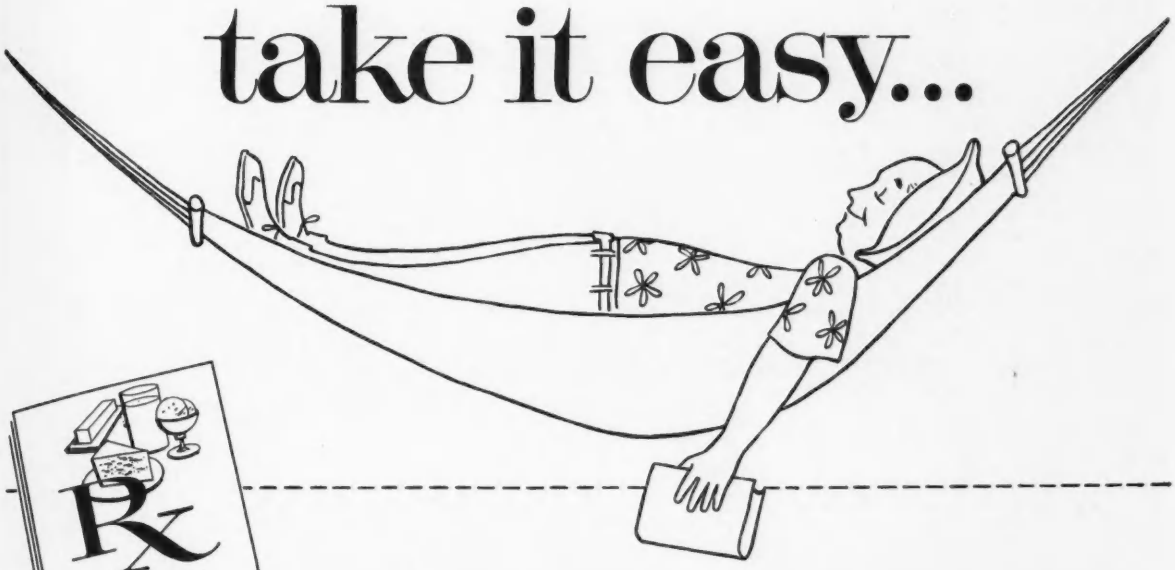

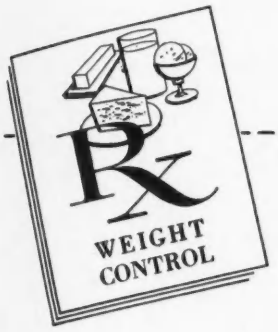

As energy requirements decrease, foods must be carefully chosen to provide nutrient needs. Medically supervised studies show that weight can be lost and desired weight maintained on a palatable diet of familiar and well-liked foods. This diet supplies generous quantities of high quality protein and calcium . . . nutrients frequently low in the food intake of older people.

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assist dietitians in their teaching responsibilities. The program included:

"Nutrition and Diet Therapy in the Nursing Curriculum"—Clotilda Laudadio, R.N., New Jersey League of Nursing

"Making Nutrition and Diet Therapy More Interesting and More Practical for Student Nurses"—Marjorie Edwards, Staff Dietitian, Mountainside Hospital, Montclair

"How We Teach Nutrition and Diet Therapy at Paterson General Hospital"—Margaret Anderson, Teaching Dietitian, Paterson General Hospital

"How We Give Student Nurses Experience in the Diet Kitchen at Paterson General Hospital"—Elaine Picazio, Therapeutic Detitian, Paterson General Hospital

"Diet Therapy Experience Correlated with Nursing Education"—Isobel Searls, Teaching Dietitian, Presbyterian Hospital School of Nursing, New York City

New York State Dietetic Association. The twenty-fifth anniversary convention of the New York State Dietetic Association was celebrated April 27 through 29 in New York City. An event of special interest was the presentation of the dietetic scholarship of $200 awarded by the T. V. Dubois Foundation, Cincinnati. This year's recipient was Antoinette M. Manuzza, a senior at Pratt Institute. She plans to use the scholarship to aid in her internship. Presentation was made by A. H. Mount of the Du Bois Company, Inc.

Ohio Dietetic Association. The 34th Annual Meeting of the Ohio Dietetic Association was held in Cincinnati on April 29 and 30. Edward H. Heyd, Children's Hospital, Cincinnati, spoke on "Administration," and Frances MacKinnon, Associate Professor of Nutrition, University of North Carolina, discussed "Community Nutrition" at the opening session. Other speakers and their subjects were:

"Techniques of Communication"—Dr. Elizabeth Munves, School of Education, New York University

"Nutrition in Medicine"—Dr. William Lotspeich, Professor of Physiology, University of Cincinnati

"Surgical Nutrition"—Dr. Edwin H. Ellison, Professor of Surgery, Ohio State University

Two Ohio Dietetic Association scholarships of $200 each have been awarded to Sally Thomas, Miami University, and Mary Jo Rothery, Ohio State University. The scholarships are awarded to prospective interns for the year 1955–56 and recipients are chosen on the basis of sense of responsibility, personality, and scholastic standing.

At the February meeting of the *Columbus Dietetic Association*, a board of nutrition experts composed of Martha Nelson Lewis, Barbara Thompson, Charlotte Fantoni, and Jeannette Ortolano, discussed the problems of the obese person, the teen-ager with poor food habits, the aged living alone, and the pregnant woman. The program showed in a practical way how the dietitian can present new information and can extend help to these people in new ways. The March meeting of the Columbus Association was held at the Lockbourne Air Force Base and featured Capt. Bauder, who is in charge of the food service at the base. Emphasis of his talk was on flight food service.

Texas Dietetic Association. The Community Nutrition Section of the Texas Dietetic Association, in cooperation with state agencies, is providing consultant help for nursing homes in the state. A series of newsletters to the operators of the homes will provide information on food buying, menu writing, management, and simple therapeutics.

The *Dallas Dietetic Association*, in cooperation with the Dallas Health Museum, is conducting its second community education program in "Nutrition for the Obese." This series of classes will be repeated annually.

Wisconsin Dietetic Association. The 1955 Spring Conference of the Wisconsin Dietetic Association was held in Milwaukee, April 22 and 23. Dr. Martin H. Seifert, of Evanston Hospital, Evanston, Illinois, spoke on "Feeding of Patients with Poliomyelitis" at the opening session. A panel discussion, "Teaching Unlimited," was also featured. Other speakers and their subjects were:

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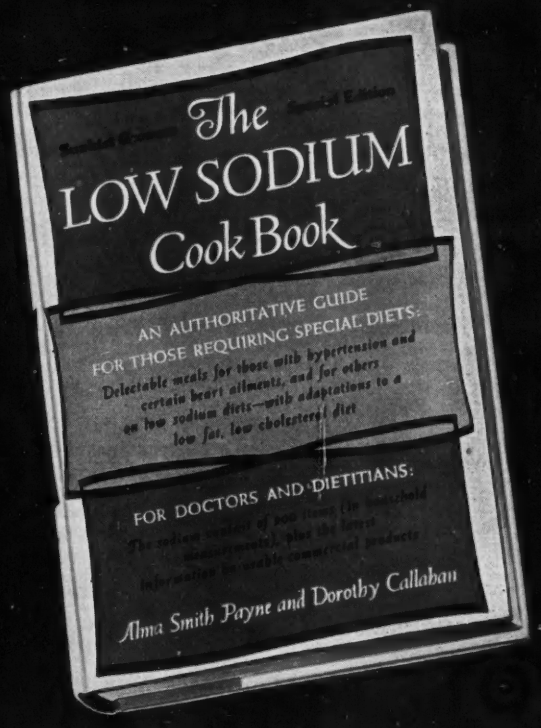


FAMOUS COOK BOOK*
FOR LOW SODIUM PATIENTS

Nearly 500 pages of useful information, including:

- *tables of sodium, cholesterol and fat contents of 900 items in household measurements.*
- *how to follow doctor's instructions.*
- *how to accommodate the family to the diet.*
- *cooking with wines, herbs and seasonings.*
- *how to prepare meats, chicken, fish, vegetables, sauces, salads and salad dressings for the low sodium dieter.*
- *how to bake breads and desserts with low sodium substitutes.*
- *use of home freezer for the dieter.*
- *how to pack a low sodium lunch box.*
- *how to "eat out" on the diet.*

**By Alma Smith Payne and Dorothy Callahan, research dietitian, Massachusetts General Hospital, with introduction by Francis L. Chamberlain, M.D., M.Sc.D.*

Last year, Sunkist made a special offer of The Low Sodium Cook Book—the widely-approved, practical guide to make saltless meals appetizing and interesting.

The offer proved so popular it is being repeated for a limited time. Once again, the book, sold in stores for $4, is available through Sunkist in a special $1.25 edition.

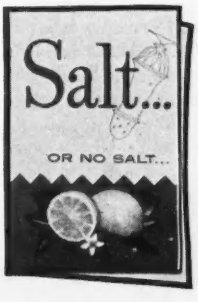
This edition is the same book with two exceptions: it has a paper cover instead of cloth and an *added* section on fresh lemons as a seasoning.

Doctors tell us that lemons—as a seasoning substitute for salt—help solve the vexing problem of keeping low sodium patients on their diets by making unsalted food palatable and interesting.

You and your patients are invited to write for copies of the complete and authoritative guide to tasty low-salt menus at the special price while the limited supply lasts.

Free handy diet booklet! "Salt or No Salt," for distribution to patients on low sodium diets, is available from Sunkist. Please use coupon, and specify quantity. *You need not order The Low Sodium Cook Book to get these booklets.*

Sunkist
FRESH LEMONS



Sunkist Growers
Section 7206, Terminal Annex
Los Angeles 54, California

Please send me postpaid _____ copies of The Low Sodium Cook Book. I enclose $_____. (Send $1.25 for each copy. Sorry, no C.O.D.'s. Send money with order. Postage prepaid in U.S. and Canada only.)

Please send me free _____ copies of handy diet booklet. (No Cook Book order required.)

Name_____

Street Address_____

City_____ Zone___ State_____

"The Use of Beer in the Restricted Sodium Diet"—Dr. Edwin G. Olmstead, Assistant Medical Director, Milwaukee County Hospital

"Personnel Management"—William Ahrens, Assistant Personnel Director, Northwestern Mutual Life Insurance Company

"The Visiting Nurse and Her Problems Relating to Family Nutrition"—Clara Rue, Educational Director, Visiting Nurse Association of Milwaukee

Two senior dietetic majors from the University of Wisconsin, Kathleen Torpy and Dorothy Kuhnke, were awarded $200 scholarships from the T. V. DuBois Foundation, Cincinnati.

Association Activities

Material for Teaching Diabetics. The "Meal Planning with Exchange Lists" booklet, "Diabetic Diet Card for Physicians," and "Meal Plans" are not available at present from Health Publications Institute, Inc., Raleigh, North Carolina. As you know, these materials were developed by the American Diabetes Association; Diabetes Branch, U.S. Public Health Service; and our Association. Please direct all inquiries and future orders for these materials to our Headquarters office.

Meanwhile, the leaflet, "Six Food Exchange Lists for Variety in Meal Planning," is available from the Government Printing Office, Washington 25, D. C., at a cost of $2.75 per 100 copies. This leaflet was developed in 1953 by the Public Health Service.

State Meeting. Doris Odle attended the New Mexico Dietetic Association meeting May 14 in Los Alamos as the A.D.A. representative.

Library Committee. The Library Committee, with Elizabeth Tuft as Chairman, met on April 26 in Headquarters Office for the purpose of reviewing materials to be placed in the Lulu G. Graves Memorial Library for loan and reference to our members.

Hands-across-the-Sea. Sixteen individuals or institutions in the field of dietetics abroad, representing the countries of Thailand, Argentina, India, Peru, Indonesia, Philippine Islands, Japan, Chile, France, and The Netherlands, have recently received subscriptions for this JOURNAL, administrative or diet therapy texts, or volumes of past issues of our JOURNAL through the project on "Professional Assistance to Foreign Libraries" of the Professional Education Section—Helen Ger Olson, Chairman. Contributions from state and local dietetic associations have provided funds for this project.

The supply of past issues of the JOURNAL in Headquarters office has now been exhausted. Issues of the JOURNAL since 1952 are needed to fill requests of our friends abroad.

A.D.A. Exhibits. "Foods—Fact versus Fallacy"—a new, lightweight A.D.A. exhibit, was introduced to the public at the *Health Fair* held in Philadelphia, May 13 and 14.

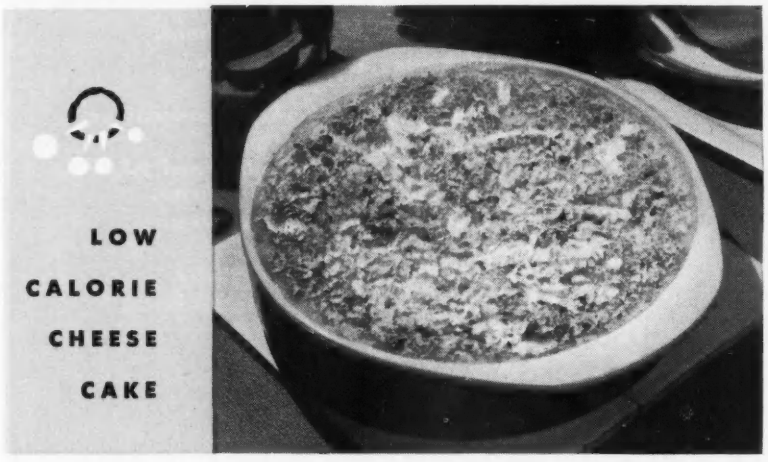
Our new shared dietitian captions with slides selected from the set on the internships were used for the first time by the Minnesota Dietetic Association at the *Upper Midwest Hospital Conference*, May 12 to 14, in Minneapolis.

The new captions for the slides depicting the responsibilities of the hospital dietitian are now available. These captions were prepared to fill the need for exhibit material at hospital association meetings and at joint meetings of state hospital and dietetic associations.

A second new lightweight exhibit, "You Can Lose Weight Safely and Pleasantly," was inaugurated at two national meetings held in St. Louis in May. It was shown at the meeting of the *National League for Nursing*, May 2 through 5, and at the *Catholic Hospital Association* convention, May 16 through 19. Members of the St. Louis Dietetic Association acted as booth attendants with Nancy Carter as Chairman.

"Achieve Your Proper Weight," the shadow box exhibit, was displayed at the meeting of the *Illinois State Medical Society* in Chicago, May 17 through 20. Katherine Vatz was Chairman of the exhibit. Members of the Chicago Dietetic Association represented the Association.

Inquiries concerning these exhibits and slides may be directed to the Public Relations Director in Headquarters office.



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MAKE IT YOURSELF WITH SUCARYL®

Here's a happy surprise for dieters—a rich-looking, sweet-tasting dessert that sacrifices nothing but the calories! All by using SUCARYL—the wonderful new non-caloric sweetener that cooks right in with no loss of sweetness. Here's how:

Low Calorie Cheese Cake

- 4 eggs
- 1 tablespoon SUCARYL Solution or 24 SUCARYL tablets, crushed
- ½ cup flour
- ½ teaspoon salt
- 1 cup evaporated milk
- 1 teaspoon vanilla
- 2 tablespoons lemon juice
- 3 cups cottage cheese
- 1 slice bread, toasted and crumbed

Beat eggs; add SUCARYL. Beat in flour and salt. Add milk, vanilla and lemon juice. Add slowly to cottage cheese, mixing well. Press through medium sieve; beat until smooth. Pour into shallow round baking dish. Dust well with nutmeg, top with toasted bread crumbs. Bake in very slow oven (250° F.) 1 hour. Turn oven off; leave cake in oven 1 hour longer. Cool slowly at room temp. Chill. Makes 8 servings, 182 calories each. Abbott

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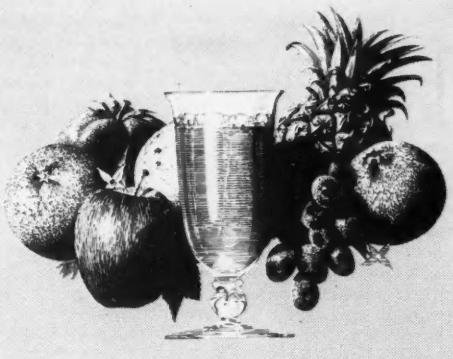
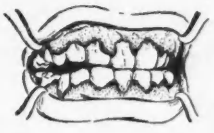
WHY SHOULD THE VITAMIN C CONTENT OF FRUIT AND VEGETABLE JUICES BE STANDARDIZED?



Because nutrition reports disclose that—

- **Vitamin C deficiencies exist throughout the country***
- **Scurvy has not disappeared from the United States***

Proof of deficiencies among adults and children. You should know these facts!* Diet surveys from Maine and Vermont, New York, Illinois, New Mexico, Oregon, West Virginia, and Texas show a definite pattern of inadequate vitamin C intake. These studies covered grade school and high school children, college men and women.



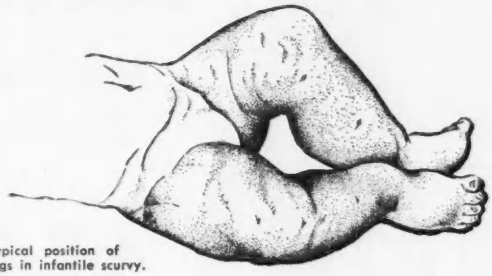
Spongy, swollen gums symptomatic of scurvy.

From these studies* of dietary habits and physical conditions there is considerable proof that many of the children and adults covered by survey have actual, physical symptoms of vitamin C deficiency.

Infantile scurvy. Scurvy* occurs, even today, among infants who are artificially fed. Fortunately the disease may be cured by the administration of vitamin C. How much more sensible it is to prevent it by supplying these bottle-fed infants with the daily allowance of 30 milligrams of vitamin C as recommended by the Food and Nutrition Board of the National Research Council for children under one year of age.

Symptoms of infantile scurvy are fretfulness and fear of being touched.

These bottle-fed infants, unless receiving a pediatric prescription containing vitamin C, are largely dependent on supplemental ascorbic acid which they receive from fruit or vegetable juices. Unless fortified with vitamin C many of the processed juices may not supply these babies with adequate quantities of this essential element.



Typical position of legs in infantile scurvy.

What can be done? Because of the increasing evidence that American diets are deficient in vitamin C, leading nutrition experts believe that processed fruit and vegetable juices, on which the public is so reliant for its supply of this necessary vitamin, should contain the "Vital Ingredient."

The Vital Ingredient of any processed fruit or vegetable juice is a *dependable* and *adequate* supply of vitamin C. You can give your juice this ingredient by *standardizing its vitamin C content*. The processing is simple and the new low cost of ascorbic acid makes juice standardization more attractive than ever.

With ascorbic acid available *by the tons* at extremely modest cost fruit and vegetable juices can have a standardized vitamin C content for the better protection of the nation's health and well-being.

*Statements are based on documented reports. References on request.

Illustrations after photographs in The Vitamins in Medicine by Bicknell and Prescott, Third Edition, published by Grune & Stratton, Inc., New York.

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News of Products and Services

Economics Laboratory, Inc. has produced a new sound and color film, "Flying Saucers." Costs, causes, and prevention of dish breakage are the theme of the film which shows actual dishroom operations where breakage control methods are demonstrated first hand. Each phase of dish handling is analyzed for cost and efficiency. The movie runs 28 min. Other topics covered in the script are: selection of china and glassware; employee training; and latest dishroom equipment.

To implement "Flying Saucers," which was produced primarily for management audiences, a companion film, "Spotlight on Breakage," has been prepared for employee training purposes. It is available in two editions—one in English, the other in Spanish. Both films were produced in collaboration with A.D.A., the American Hotel Association, and the National Restaurant Association.

Gifford-Wood Company has announced the development of a new machine using the principle of centrifugal force for cutting, rather than grinding meat into hamburger, at the same time removing tough gristle. As the cylinder and turntable of the "Magicut" revolve, the meat is pressed by centrifugal force against perforations, and knives shear off particles without bruising. Thus clean-cutting action is provided in contrast to the tearing, lacerating action of conventional grinders. Comparative tests by a New York restaurant chain indicated that trimming time for preparation of round or chuck was 2½ hr. with Magicut in contrast to 4½ hr. with a conventional grinder; yield was greater, due to less waste in trimming; raw meat had a better natural color; meat was more evenly minced and cut; no gristle was found in Magicut-processed meat; Magicut meat evidenced no bleeding; and taste panels found cooked Magicut meat juicier and more flavorsome.

The new Vimco Model RS-40-S of the *Victory Metal Manufacturing Corporation* features interchangeable interiors adjustable on 1-in. centers. Thus any combination of bakers' pan slides, stationary or pull-out meat rails, stationary or pull-out shelves and refrigerated drawers can be accommodated. With a capacity of 40 cu. ft., the new model is also available as a pass-through unit.

A new, non-foaming wetting agent, called "Rinse-Aid," was demonstrated by *Calgon, Inc.*, at the National Restaurant show in Chicago in May. The new product is designed to eliminate spotting and filming on dishes. This result is said to be accomplished by breaking the surface tension of the water, allowing it to drain away in sheets, without leaving behind the drops that dry in spots. Thus the need for special dips and toweling is eliminated. Rinse-Aid is tasteless, odorless, and non-toxic. For use with Rinse-Aid, the company has also developed a special automatic dispenser to introduce the concentrate directly into the rinse line.

Durkee Famous Foods has developed two new products. The first is an homogenized margarine which has a smoother texture and richer, more delicious, natural flavor, according to the manufacturers. A second new product is a pure concentrate of dehydrated onions, which is specially recommended for use in meal preparation and for sprinkling on meats and salads to suit individual taste preferences.

Hotpoint Co. is introducing what is termed "the world's most powerful and fastest big production electric griddle." The new unit cannot be "killed," even under continuous loads of frozen hamburger on a 24-hr.-a-day schedule. The griddle is 36 by 18 in., the entire area of which is usable for cooking. It is capable of producing over 700 ¼-lb. hamburgers an hour. The griddle does not have to be set at an excessively high temperature to compensate for a temperature drop, for after it has reached the correct dialed temperature, the small drop is compensated for automatically, and the griddle is returned to correct cooking temperature. Other features of this new Rocket 12 include: two sectional heat controls that permit the operator to use either side of the griddle independently, two thermostat controls that hold any dialed heat between 200° and 450°F. accurately; automatic signal lights that indicate when

NOW! This New Gleaming, Attractive VOLLRATH stainless steel Bedside Set

3-pc. Bedside Set includes:
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Water bottle unbreakable . . . will not impart any "foreign" taste

Good looks and good service go hand in hand with this wonderful Vollrath stainless steel Bedside Set. Its gleaming finish lasts through the years . . . the sturdy steel takes the bumps in stride. And nothing is easier to keep sterile than stainless steel! Write us for complete information today.

First in STEEL Utensils
Stainless Steel and
Porcelain Enameled Steel

SINCE 1874
The Vollrath Co.
SHEBOYGAN, WISCONSIN

POULTRY MEAT
in the Modern Diet

Rich in Protein – Relatively Low in Calories

Overweight is recognized as one of this country's leading health problems. In prescribing diets for the "weight-watcher" it is sometimes difficult to advise on foods which are appetizing, and at the same time help in obtaining the objective of effective and healthful weight loss.

Poultry meat lends itself as an acceptable main dish contribution to the modern diet concept on both counts. It supplies high quality protein and is relatively low in calories. It is therefore important in reducing and maintenance diets for all ages, and can be prepared in a number of taste-tempting ways to relieve mealtime monotony.

Protein and other nutrient contributions of poultry meat are charted below for easy reference.

FOOD VALUES IN 100 GRAM PORTIONS OF POULTRY MEAT[1]

(About 3½ ounces of raw broiler meat; and 3½ ounces of raw (medium) turkey meat)

	Chicken	Turkey		Chicken	Turkey
Calories...	151	268	P.....	200 mg	320 mg
Protein....	20.2 gm	20.1 gm	Thiamine...	.08 mg	90 mg
Fat.....	7.2 gm	20.2 gm	Riboflavin..	.16 mg	140 mg
Ca.....	14.0 mg	23.0 mg	Niacin.....	10.2 mg	8.0 mg
Fe.....	1.5 mg	3.8 mg			

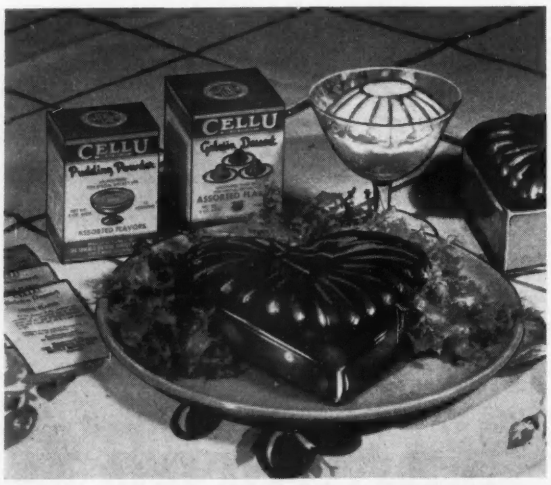
[1]Food Values of Portions Commonly Used, Bowes and Church, 7th Edition, 1951.

Poultry and Egg National Board

185 N. Wabash Ave., Chicago 1, Ill.

a Non-Profit Organization Devoted to Research and Educational Work on Behalf of the Poultry Industry.

Twenty Tasty Servings—
In Individual Envelopes
And One Pound Boxes
For Institutional Use.



Sugar-Free Desserts—

FOR LOW CALORIE DIETS

Make colorful, sparkling desserts and salads with CELLU GELATIN DESSERT. *It's sugar-free!* Six refreshing flavors: true fruit Orange, Lemon and Lime, imitation Raspberry, Strawberry and Cherry. Packed in single-serving envelopes and 1 lb. boxes for institutional use.
CELLU LIQUID SWEETENING—Saccharin sweetening in liquid form (5 drops equal 1/4 grain saccharin). In handy 4-oz. dropper bottle.

CELLU LOW CALORIE *Dietary Foods*

CHICAGO DIETETIC SUPPLY HOUSE *Inc.*
1750 West Van Buren Street Chicago 12, Illinois

FREE Samples and Catalogs Upon Request

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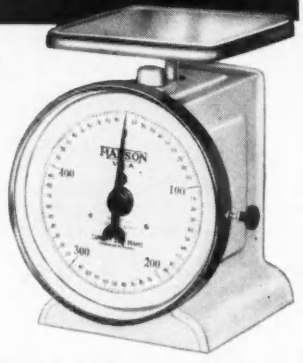
2 HANSON SCALES

that work together in restricted diets and weight control.



DIETETIC SCALE, standard with the medical profession for controlled diets. Rotating dial eliminates computation as each item of food is added on the serving plate. Capacity 500 grams by grams. Stainless Steel platform, white enamel body, easy to keep clean.

Model 1411 (illst.) has glass protected dial, price **$15.00.**

Model 1440 enamel dial, price.....**$10.00**

Weighmaster the personal scale, dependable for checking gain or loss in weight under medical supervision. Graduations are easy to read. The Weighmaster is precision built and triple tested for accuracy.

Available in seven bathroom colors and all chrome.
Prices **$7.95** for colors, **$10.95** for all chrome.
(Far west 50c higher)

See your supply house or local drug store

HANSON SCALE CO. *(Est. 1888)* **Northbrook, Illinois**

the griddle has reached correct cooking heat; front and back grease drain for easy scraping of the griddle; new grease guard on back and side to protect counter and wall from splatter; quick preheat time; and a 6-qt. capacity removable grease container.

Metropolitan Wire Goods Corporation is now offering new protection for glasses in a plastisol-lined, compartment Sani-Stack rack. Each compartment is coated with a resilient plastisol which absorbs shock, prevents scratching, and eliminates noise, at the same time saving cost and cutting loss due to breakage. The plastisol material is unaffected by hot water or by detergents in mechanical dishwashers. The compartments, which are made for either stemware or shell glasses, are surrounded by a protective metal frame, made from either tinned wire or stainless steel.

Universal Dishwashing Machinery Company has announced two new upright door-type dishwashing machines, one a straight-through operation and the other a corner operation. These models require less than 4 sq. ft. floor space and have no pipes in back. The machines are rated at 900 dishes per hour and provide operating capacity for all types of dishes and small trays. The power wash features a double-action, revolving wash above and below the dishes as well as a rinse which revolves above and below the dishes for full coverage. In addition, the new models provide the standard Universal features such as electrically timed wash and rinse control and electric- or gas-operated final rinse boosters.

Market Forge Company has designed a new combination two-compartment steam cooker and 40-gal. direct-connected steam-jacketed kettle. These steam cookers provide capacity for steam pressure cooking of all types of vegetables, meats, fowl, and seafoods, as well as kettle capacity for soups, casseroles, sauces, and gravies. The steam cooker operates at 5 lb. pressure, and because it is connected to an extra large boiler, steam pressure builds up almost immediately. The 40-gal. steam-jacketed kettle is also connected directly to the boiler at the same pressure and will bring 40 gal. water to a boil in about 30 min. This equipment requires only one fuel, water, and drain connection instead of the two normally required for separate steam cooker and kettle.

"New Horizons in Food Service" is the title of an illustrated, eight-page booklet showing modern food service layouts with mobile equipment, published by *W. H. Frick, Inc.*, producer of Dispensators. This booklet is designed to show how food service institutions can achieve streamlined efficiency through the use of mobile equipment.

John Sexton & Co. plans to build a new distribution and office building in Chicago and also to expand its Indianapolis plant. In enlarging the Indianapolis plant, the company will consolidate all of its manufacturing operations in that location, including those which are now carried on in Chicago.

Dorothy Greey Van Bortel, Ph.D. has been appointed Director of Nutrition and Home Economics for the *Cereal*

Libbey HEAT-TREATED

Libbey Safedge Heat-Treated Tumblers

Be sure...

you're getting Libbey Heat-Treated Quality

The blown-in trade mark Ⓛ brands it as a Libbey-made glass. The "H-T" acid mark identifies it as the finest Heat-Treated quality. These two marks are your assurance you are getting genuine Libbey Safedge tumblers. Look for them—insist on them—and be sure you're getting Libbey quality.

cost you less...

A Libbey Heat-Treated Tumbler averages up to 200 servings, yet costs only a few pennies! That makes its cost per serving only a fraction of a mill.

because they last longer...

Libbey Heat-Treated Tumblers are specially processed to stand up 3-5 times longer than ordinary tumblers under the heaviest service conditions. They take hard knocks and sterilization temperatures in stride.

Through reduced breakage, you'll need fewer glassware replacements, smaller inventory, less storage space. And you get additional savings through Libbey's chip-resistant rims, guaranteed: "A new glass if the rim of a Libbey 'Safedge' glass ever chips."

In the Libbey line there is a complete range of matching, open stock items. You're sure of being able to add matching items when you want them later on.

Just see your Libbey Glassware supplier or write direct to Libbey Glass, Division of Owens-Illinois, Toledo 1, Ohio.

LIBBEY HEAT-TREATED GLASSWARE
AN Ⓞ PRODUCT

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Mobile AMF LOWERATOR Dispensers

No more "crash and carry" trips. When you use the Mobile AMF Lowerator Dispenser System, planned supplies of dishes can be wheeled directly from dish washer to service area without rehandling. Provides quick, sanitary, service-level dispensing. MAKE WORK EASIER—REDUCE BREAKAGE! For full details write AMF LOWERATOR DIVISION, 261 Madison Ave., New York 16, N. Y.

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EATING IS FUN—
for
Older People, Too

Designed to Aid Proprietors of Small Nursing Homes and Residences.* Also *Adaptable to Home Kitchens

This attractive booklet is a guide to better food and food service in the small institution.

Based on normal nutritional requirements for adults, the menu patterns, sample suppers, and pointers on meal planning have their place in any household. Practical ideas for making the work of the manager easier and pleasanter include a weekly marketing guide, hints for economy in buying and storage, and suggestions for serving.

This is a project of the Diet Therapy Section of The American Dietetic Association.

Single copy 50¢

Five copies..... $2.00
Ten copies..... 3.75

Order from:

THE AMERICAN DIETETIC ASSOCIATION
620 North Michigan Avenue
Chicago 11, Illinois

Institute, Inc., Chicago. Dr. Van Bortel was formerly Assistant Professor, School of Home Economics, Michigan State College, and has also taught at Merrill Palmer School, Hood College, Iowa State College, and University College, Northwestern University.

General Foods' Institution Food Service has prepared a new recipe sheet, Tempting Dishes," which contains quantity recipes made with Genesee Plain Gelatin. For each recipe, cost per portion and calories per serving are given.

Savory Equipment, Inc. has announced the introduction of a counter toasting appliance designed especially for such items as toasting hamburger buns and English muffins. The toaster has a capacity of four half buns a minute. Its combination of small physical size and low consumption of electricity will appeal to small food service establishments. The toaster is constructed of stainless steel and has a horizontal conveyor moving from front to back, driven by a constant speed geared motor. The buns drop off the conveyor onto a chute which delivers them back to the front of the machine where they can be picked up by the operator. A switch, with a lever device for raising or lowering the heating element, controls the heat.

Best Foods, Inc. has developed a new white sauce mix which is a blend of the company's margarine, flour, and dry milk solids. Only water needs to be added at the time the sauce is needed. The recipe produces the three basic white sauces—thin, medium, and thick. The mix can be stored in the refrigerator in a covered container for use when needed. The Company has published a booklet on the mix recipe, plus some recipes using white sauce, titled "Magic White Sauce Mix."

Barbara Clinton, a member of the A.D.A., has been appointed to the home economics staff of *Western Growers Association*. Miss Clinton, a graduate of the University of Iowa, was formerly with Sunkist Growers. In her activities with Western Growers, she will work with homemakers, home economics societies, food and dietetic specialists and experts, and university nutritionists. The Association is planning an intensified promotion program to increase national use of vegetables and melons from California and Arizona.

Borden is introducing a blend of Grated Romano and Parmesan Cheese. The combined flavors of these cheeses are especially good when used as a condiment with other foods. It is also popular atop foods to be grilled or baked; the cheese browns quickly and easily to look rich and tempting. The new product is grated and packed in 1½- and 3-oz. cylindrical, aluminum-foil-covered cardboard canisters with a metal, shaker-type top.

Vacuum Can Co. has introduced a new stainless steel, improved sterilizer for garbage cans and heavy kitchen utensils. The company has also improved its line of six sizes of AerVoiD, all-stainless steel portable vacuum insulated hot food and liquid carriers, to meet the sanitary construction requirements of the U. S. Public Health Service.